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AMBLER'S MOMENTUM CYLINDER BRAKE.

Improved Rail Car Brake.

The object of the invention here illustrated is to connect the brakes of all the cars in the longest train so as to enable the engineer or any one man at the head of the train, or upon any separate car in the train, to simultaneously, and uniformly, and with the most perfect equality of pressure upon all the wheels, apply the means of communicating power to the brakes at any moment, and obtain the maximum of pressure within three seconds.

Mr. A. I. Ambler, the inventor, has secured by Letters Patent through the Scientific American Patent Agency, several other combinations based upon the novel principles he seeks to inaugurate, combining simplicity, economy and efficiency, which will be illustrated as early as possible.

The plans of the inventor contemplate and secure three important, substantial and practical results never before obtained in car braking, viz., continuity of power, simultaneousness of action and perfect uniformity of pressure upon all the wheels throughout the train; to which may be added the fact that any separate car may be broken without interfering with the means by which the continuous breaking is effected, thus combining all the advantages of the old system of braking with the introduction of the new principles evolved. These brakes dispense with all brakemen, prevent the wheels of cars from sliding on the track, bring the whole face of the shoe upon the wheel and prevent unequal wearing, operate each separate car in its place without being drawn against the car to which it is coupled, and enable the engineer or person having charge of the brakes, to brake the entire train in the time it would require the engineer to signal the brakeman in the ordinary method of braking, thus doing away with intermediate wills, and placing the entire braking power in the hands of the engineer or single brakeman.

In all these combinations a tumbling or rotating rod is attached to each car or the trucks thereof, supported by suitable bearings and connected between the cars by two universal joints and one slip joint; the slip joint being formed of a funnel and slide supported by a yoke spring and suspended just beneath the coupler or draft head between the cars, and so arranged as to elevate or depress the tumbling rod at pleasure, for the purpose of adapting the same to the different hight of cars to enable the tumbling rod connection (the slide and funnel) to be coupled by the simple act of the cars coming together, while this coupling of the tumbling rod is held together only by the coupler or draft head of the cars in connection, and disconnects freely when the cars are uncoupled, the slide in the funnel having perfect freedom of action, being in no way held or fastened therein. This arrangement between the cars allows perfect freedom of action to the cars when in motion, while the tumbling rod is thus susceptible of being freely operated, upon all grades and curves of the road, and is therefore always effective.

Fig. 1.

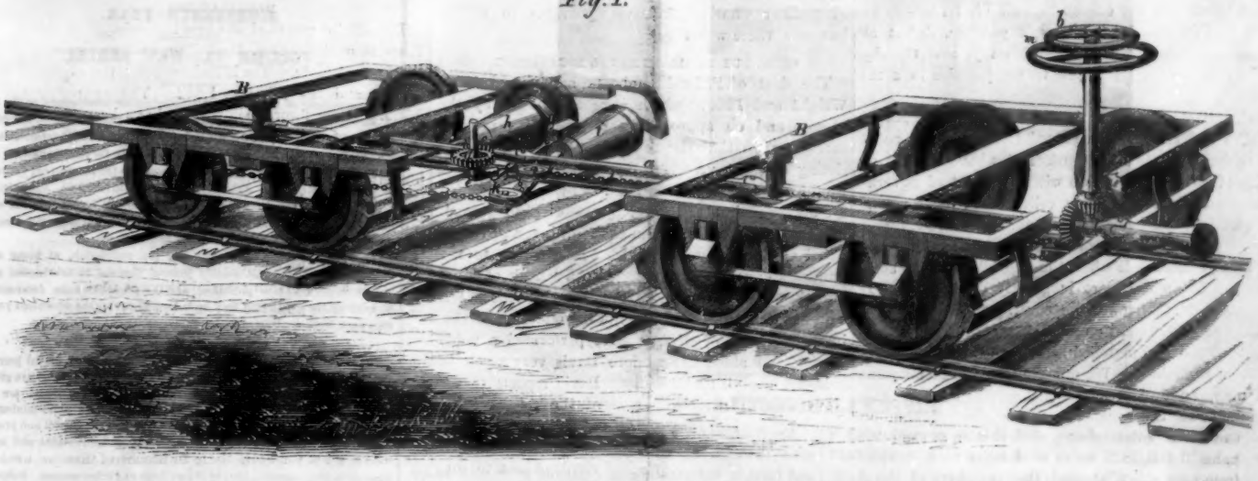
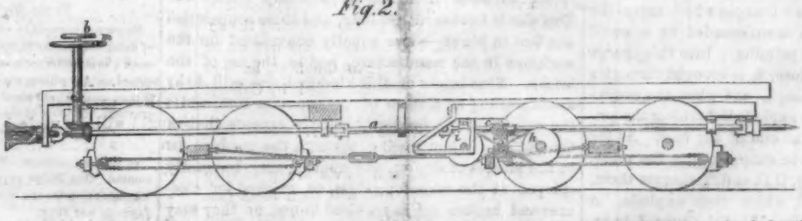


Fig. 2.



This arrangement completely obviates all the objections that have hitherto stood in the way of braking a train of cars by transmitting power through the rain by means of a rotating rod.

With the foregoing we will be better able to describe the invention as represented in the illustrations presented.

In the engravings, B B represent the truck frames, beneath which the coupling rod, *a*, is secured, the rod being furnished with a bevel gear so that it may be turned by the hand wheel, *b*. A worm screw, *c*, is formed upon the rod so as to mesh into the pinion, *d*. Upon the shaft of this pinion is a crank, *e*, carrying upon its end the connecting rod, *f*, which grasps at its opposite end the belt, *g*. This belt passes around the cone, *h*, on one of the axles of the car, and it also passes around the cone, *i*, which fits loosely upon one of the arms of a bent lever. This lever has its fulcrum at *j*, with both of its arms free—one arm carrying the cone, *i*, and the other the friction roller or pulley, *k*. A friction roller also surrounds the fulcrum of the lever, and a chain, *l*, is passed around both of these rollers and secured, one end to the car frame and the other to the levers of the brakes.

It will be seen that when the rod, *a*, is turned, the motion of the crank, *e*, will carry the belt, *d*, outward toward the side of the car, thus drawing the larger end of the cone, *i*, toward the cone, *h*, and tightening the chain, *l*, so as to actuate the brakes.

At the inner or smaller end of each cone is a pulley (one of them being loose), for the belt to run on when the brakes are not applied, and as a belt will always run on to the largest part of a pulley, it is only necessary to slip the belt, *g*, upon the smaller ends of the cones, when it will run to the larger ends itself; the power that carries it outward being in fact the momentum of the train, hence the name, Momentum Cylinder Brake, which is so appropriately applied to this device. The brake, being thus pressed against the wheels by the momentum of the cars, requires the exertion of very little power on the part of the operator—only sufficient to slip the several belts from the pulleys on to the ends of the cones.

The shaft of the hand wheel, *b*, is surrounded by a hollow shaft upon which is a hand wheel, *m*, and a chain is wound around this outer shaft to operate the brakes when the car is detached from a train, without turning the rod, *a*.

The parties owning this invention are now engaged with railroad men with a view to its practical application on a leading road out of Chicago, while Mr.

Ambler is also perfecting a series of ingenious improvements in the rolling stock of railroads generally, which will be given to the public in due season.

The patent for this invention was procured through the Scientific American Patent Agency, in the United States on the 1st of April, 1862. Patents have also been taken out in several foreign countries. Information in relation to the invention may be obtained by addressing Warrick Martin, Chicago, Ill., care of Sherman House, or at Milwaukie, Wis.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION OF THE ARMIES.

The situation of affairs just now is critically interesting, and speculation is rife and ingenuity is fertile in solving the mystery that hangs over the present condition of things. What has become of Beauregard? is still the great question. Some 20,000 of his deluded followers have either deserted or have been taken prisoners, and so far as himself is concerned

"Quoth Hudibras, friend Ralph, thou hast
Outrun the constable at last."

He has got away, so says report, with an army of some 80,000 men—a formidable force—but what he intends to do is a mystery which time alone will reveal. The impression prevails that he has reached Richmond with the flower of his army, and that the Mississippi Valley is given up temporarily, with a view of making a desperate and last determined stand in front of Richmond. There is some probability in this theory; indeed, we have often wondered why Jeff Davis did not concentrate all his forces—as he can do by railroad—and thus, if possible, defeat at least one wing of the Federal army, and thereby secure a basis upon which to compromise in some way.

Gen. Halleck's army is far down the Mississippi Valley and cannot be changed from point to point with facility, while the Confederates have the advantage of railway connection with their seat of government; this affords them excellent facilities for concentration, and by backing off and drawing our forces forward the possibility of a junction of all their forces is greatly increased, while the possibility of any such movement on our part is greatly diminished. It seems to us, taking all the contingencies into view, that our government ought to have taken every man that offered and marched him on to Richmond to reinforce McClellan. We must not fail there for want of men, and we presume the government is fully awake to all the urgencies of the case. Richmond ought to fall by the defeat and dispersion of the rebel army, and in order to do this we shall need an overwhelming force. We believe Gen. McClellan is equal to this great task—only give him the means wherewith to do it. Gen. Fremont is nobly following up the retreating forces of Jackson, and in a severe battle fought on Sunday the 8th inst, near Harrisburg, he drove Jackson back and occupied his camping ground, with heavy losses on both sides. The General states in a dispatch to the War Department yesterday, dated on Saturday, that the loss of the rebels on their retreat from Harrisburg on the day before the battle was very severe. Among the killed was the ubiquitous Colonel Ashby, who, with his cavalry, has been harassing our troops in Western Virginia at almost every quarter. We scarcely heard of a single battle or skirmish for months past that Ashby and his cavalry did not have a hand in. When he was slain, according to Gen. Fremont's report, he was covering the retreat of the enemy with his whole cavalry force and three regiments of infantry with admirable skill and audacity. The retreat was followed up by pursuit on the part of Fremont's forces.

We hope Fremont will not be caught in a trap.

MEMPHIS—ITS SITUATION AND SURRENDER.

The surrender of Memphis to the Federal authorities is certainly one of the most important achievements of the war for the Union and Constitution. This important city is situated on the Mississippi River on the fourth Chickasaw bluff, four hundred and twenty miles below St. Louis, and contained according to the census returns of 1860, 50,000 inhabitants. In 1840 it had only 8,839. Thus it will be seen that no other city in the Union had grown more rapidly than Memphis, and at the hour when the State of Tennessee undertook to secede from the Union its prosperity and growth were almost unparalleled. Now its streets are almost deserted, and desolation and gloom hang, temporarily at least, over its once fair prospects. The leading citizens of Memphis have been quite as bitter against the government as any other in all the South, while its press was vitriol and gall boiled down. It is now a conquered city, and like New Orleans, and all the other cities and towns along the Father of Waters, can never escape the authority of the government of the United States. The millions who inhabit the great and rich valleys of the Ohio, Missouri and Upper Mississippi, will never allow a weaker power than themselves to hold control of the mouth of that River.

The bluff on which Memphis stands is thirty feet above the highest floods, and along its front extends a fine esplanade several hundred feet wide—facing which are the principal warehouses. The landing place is a sandstone ridge, which projects into the river from the foot of the bluff. Memphis has had an immense business. Especially in cotton, the shipments of which for the year ending September, 1860, were upward of 400,000 bales. In addition to its river advantages it is an important railroad center—a point, indeed, on which is destined yet to stand, under the auspices of the Union, one of the great cities of the American continent. The people of that city have been blinded to their own interests by the madness and fanaticism of a vile press and a viler set of political ruffians, whose mission is either to rule or ruin.

The city formally surrendered on the 6th inst., to Flag-officer Charles N. Davis, previous to which, however, there was a

SHORT BUT BRILLIANT NAVAL ENGAGEMENT.

The fleet of Federal gunboats had passed Forts Wright and Pillow, which were abandoned by the enemy, and on approaching Memphis it appeared pretty certain that the rebel fleet of gunboats, consisting of eight vessels carrying twenty-five guns, would make a stand. They did so by opening a brisk fire on the Federal fleet, which was briskly returned. The contest begun at 5.30 in the morning, and terminated at 7 in a running fight. In addition to the gunboats engaged there were also a "flock of loyal rams," under command of Col. Charles Ellett, Jr., who has long contended for the introduction of this important arm of defence. He performed a noble service, and aided Commodore Davis very much in gaining his brilliant victory. Davis reports to the Navy Department that seven of the rebel vessels were captured or destroyed, only one making its escape. This was the last hope of Memphis, whose citizens only a week before had resolved not to surrender the place. Col. Gorham N. Fitch, late United States Senator from Indiana, is acting as Military Governor of the city, and we indulge the hope that its citizens will return at once to their allegiance, and set about repairing the immense damage which has been wickedly brought upon their once thrifty and beautiful city.

The flotilla of eight gunboats which contributed so much to this gratifying result were razeed and fortified by covering their sides with two layers of live-oak timber, each about eight inches thick. The prows are iron-plated and quite sharp, and instead of heavy guns these vessels carry a number of sharpshooters, whose firing among the rebel gunners during the action was very effective. These rams are not under the command of the flag-officer of the fleet, but are a part of the army and are commanded by Colonel Ellett.

THE OPENING OF THE MISSISSIPPI

is an event which cannot long be delayed. The fleets of Commodores Farragut and Davis are gradually making toward each other, and will soon meet face to face in the great river. Not in hostile array—not for the purposes of deadly strife, by terrific bombardments and hand-to-hand encounters on the quarter-deck; but to shake hands under the old flag, and exchange congratulations that the gallant navy has unlocked the commerce of thousands of miles to all nations, and completely destroyed all the enemy's works, including his navy, which after all was no mean affair. When this object is fairly attained, it will be an epoch in our history, and may well enlist all the hearty rejoicings of the whole world, and especially of our own countrymen.

At last accounts, Farragut's fleet was at Vicksburg—the rebel forces at that place refusing to surrender. Com. Davis can now push forward and clear the river below Memphis, as it is believed no serious obstructions exist below that city. We may, therefore, soon hear of the junction and active coöperation of the two fleets to give the last and finishing stroke to the free navigation of the Mississippi. This act literally cuts the Confederacy in twain, and places all the country along its banks forever under the control of the government. Surely this is an event over which we may all rejoice.

GEN. MITCHEL AT CHATTANOOGA, TENNESSEE.

The War Department has received information of the advance of the division of Gen. Mitchel upon Chattanooga. His advance forces under command of Gen. Negley, have had a sharp engagement with the rebels, who were utterly routed, and their baggage, ammunition and supplies taken. The astronomical general is after the enemy, and we may soon expect to hear of more of his gallant exploits. Chattanooga is, or was, a flourishing town on the Tennessee river, near to the Georgia line, and is the terminus of the Nashville and Chattanooga, and of the Western and Atlantic railroads. The advance from this place, either upon Cleveland or Dalton, will cut the Southwestern line of railroad from Richmond just as effectually as though it was done at Knoxville, though the latter point would be much the more satisfactory, as it would be "a harbinger of sweet relief" to those noble mountaineers of East Tennessee, whose devotion to the country is grand and impressive in suffering and sorrow.

MISCELLANEOUS.

The official report of the loss in the battle of Seven Pines is made by Gen. McClellan, and much exceeds the first estimate. The killed are 899; the wounded, 3,627; and the missing, 1,222. The aggregate is 5,739. These figures show it to have been, next to the battle of Shiloh, the most desperately fought field of the war. The Richmond *Dispatch* sets down the loss at 8,000, which includes five generals, twenty-three colonels, ten majors and fifty-seven captains, killed or taken prisoners. The *Dispatch* also complains that the National forces can at any time cut off the retreat of the Confederates South by seizing the railroads at Petersburg, and intimates that a retreat to Lynchburgh and the mountains was the only one left to them.

The Navy Department has issued proposals for the construction and complete equipment of fifteen gunboats, with a speed of not less than thirteen knots, to be delivered within four months; and in conjunction with the War Department, proposals are invited for heavy guns for both these branches of the public service.

Paymaster Wise, of the gunboat flotilla, publishes a card in the Western papers, in which he says: "I have paid the whole expense of the flotilla from the first, and including the cost of the gunboats, their equipment, the purchase of several large steamers, pay of officers and men, and the accumulation of a vast amount of material got together in a hurry, and with all the disadvantages of forming a navy in the far West, our whole expenses do not thus far cover three millions of dollars, and we have hardly a debt unpaid. Our expenses are now about $150,000 per month, making $5,000 per day.

The *New Ironsides*, building at Philadelphia, has already received four tiers of plates upon her sides, and some idea can now be had of the impregnability of the vessel. As she now lies in the water she does not draw over eight feet; the remaining seven of her draught will be made by the use of the remaining iron plates. She will be ready for sea by the 15th of July.

In the second number of the Scientific American, issued Sept. 4, 1845, the editor presents to his readers what he terms "The Labyrinthian Curiosity—the City of Jungo, the bewilderology of which has no parallel." The engraving resembles the Chinese scrawls which usually adorn the sides of a weather-beaten tea-chest, and we doubt not the good reader at that time looked upon the picture as a complete "bewilderology."

Dr. G. F. J. Colburn, of Newark, N. J., informs us that the patents for his improvements in lamps, illustrated on page 273 of the current volume of the Scientific American, have been allowed.

Indian Implements for Cotton Culture.

A contributor to the last number of the *Edinburgh Review* gives the following description of the Hindoo plow :—This is apparently a rude instrument but in effect it is most efficient. It is formed invariably out of strong tough wood. A branch of a tree furnishes the bend required for the plowshare and the handle. The share or body of the plow is shaped to a point, and a strong coulter of iron is fitted into a groove on the upper side of the share, and is held there by strong clamps. When fitted it projects a few inches beyond the wood.

Ropes of untanned hide are fitted to the stem or handle of the plow, and are connected with yokes in front, which are again fixed on the necks of the oxen. This heavy implement plows very deep, probably from a foot to a foot and a half of the soil, and tears it up in huge clods, breaking the tangled and matted grass roots below the surface. The field is plowed two ways, or perhaps three, or four, according to the quality of the soil, and until it is thoroughly broken up. All stumps are then removed, dug out, or burned, and the field allowed to remain as left by the plow, through the whole of the hot season. The clods of earth are in fact baked, as it were, and all the grass roots withered and killed. Without this process, the grass roots would not be eradicated, and would spread again with rapidity. On the first fall of rain all the clods swell and fall into powder, not unlike the process of slaking lime ; and when this is complete, a large hoe, formed of a block of tough wood into which a strong iron hoe about three feet long is fixed at an angle of 45°, is employed with a pair of bullocks, or two pair if necessary, to clean the surface. This instrument collects all grass roots as it moves, which are thrown off in heaps as the hoe is clogged ; and the soil is turned up and thrown over the back of the iron portion of the hoe, so as to mix and pulverize it perfectly. The hoe is used as long as there is any inequality or roughness in the field ; the roots and grass are afterward collected and burned, and the ashes spread over the land. The field is now ready for sowing ; and if care be taken to eradicate grass afterward, there is no need of the heavy plow, or of subsoil plowing, for twenty years ; at the same time it is employed should the surface soil grow poor. The surface remains clean ; and the yearly cleaning by the hoe, or by a light plow, and subsequent drill plow, sowing is sufficient to ensure good crops.

The Sounding Properties of Rooms.

A correspondent of the London *Builder*, presents the following useful ideas on the proportions of rooms for propagating sound. He says :—A building of a certain hight, length, breadth and form, is required to enable an assemblage of persons to hear clearly and distinctly in every part of the room. I only know one room which is as near perfection as possible, viz : a concert room at Harrowgate. The following are its dimensions :—

Length of room inside	86 feet 6 inch.
Width	33 "
Hight to ceiling line	22 " 7
Hight to center of ceiling	24 " 2

The ceiling is the segment of a circle rising one foot in seven inches. There are nine sunken panels in the length of the ceiling and seven in width, each 9 inches deep. There are nine large windows along the north wall, three at the east and three at the west end. On the south side there are two doors and one window, a small orchestra 10 feet high and two Doric columns on each side of the orchestra.

Washing Silk.

No person should ever wring or crush a piece of silk when it is wet, because the creases thus made will remain forever, if the silk is thick and hard. The way to wash silk is to spread it smoothly upon a clean board, rub white soap upon it and brush it with a clean hard brush. The silk must be rubbed until all the grease is extracted, then the soap should be brushed off with clean cold water, applied to both sides. The cleansing of silk is a very nice operation. Most of the colors are liable to be extracted with washing in hot suds, especially blue and green colors. A little alum dissolved in the last water that is brushed on the silk, tends to prevent the colors from running. Alcohol and camphene mixed together is used for removing grease from silk.

Poisonous Effects of Carbonic Oxide Gas.

Carbonic oxide gas is the product of imperfect combustion, and it is composed of an equivalent each of carbon and oxygen. It is very poisonous. Birds placed in a vessel containing it have dropped dead before they could be taken out. Sir Humphrey Davy took three respirations of it mixed with one-fourth of its bulk of common air, when he became temporarily insensible. This loss of sensation was succeeded by giddiness, sickness, acute pains in different parts of the body, and extreme debility ; some days elapsed before he entirely recovered. Rabbits have been killed in seven minutes when put into a mixture of this gas with seven parts of atmospheric air. One per cent of this gas in atmospheric air has killed a dog in a minute and a half. Quite recently Dr. Letheby, of London, ascertained that air containing only 0.5 per cent. of the gas will kill small birds in about three minutes, and that a mixture containing one per cent of this gas will kill in about half this time. In all these cases, the effects are the same. The animals show no sign of pain ; they fall insensible, and either die at once, with a slight flutter—hardly amounting to convulsion—or they gradually sleep away. The post-mortem appearances are not very striking: the blood is a little redder than usual, the auricles are somewhat gorged with blood, and the brain is a little congested. In birds there is nearly always effusion of blood in the brain.

Several accidents have demonstrated how injurious this gas is to human beings. Dr. Letheby relates the following accidents occurring from the use of water-gas, which has been used as an agent of illumination. He says:—

Water gas sometimes contains as much as 34 per cent of carbonic oxide. It is obtained by passing steam over red-hot charcoal ; and, as the steam is decomposed by the ignited carbon, the hydrogen is set free, and carbonic oxide, is produced. Selligue, in 1840, obtained permission to use the gas in the towns of Dijon, Strasbourg, Antwerp, and two of the faubourgs of Paris and Lyons. At Strasbourg, an accident occurred, which put a stop to its use. The gas escaped from the pipes into a baker's shop, and was fatal to several persons ; and, not long after, an aeronaut, named Delcourt, incautiously used the gas for inflating his balloon. He was made insensible in the car ; and those who approached to render him assistance fainted and fell likewise. The use of this gas has been interdicted on the continent of Europe.

Chemistry of Iron.

It is stated in the *Comptes-Rendus* that MM. Minary and Resal have been experimenting for two years with cast iron and they find that the puddling operation has for it object the burning of an excess of carbon. Gray and black cast iron contains but little oxigen. Granular white cast iron contains a considerable quantity of oxide, and is very easily refined, but they say it does not make good wrought iron. The fusibility of cast iron increases with the quantity of oxygen it contains. Two crucibles, the one containing iron scraps and the other containing scraps and a certain proportion of the oxide of iron were placed in a furnace, when the former were found merely softened and adhering together, but the latter were fused into one mass. Bessemer's process, it is asserted, should only be applied to gray cast iron.

Washing Woolens.—If you do not wish to have white woolens shrink when washed, make a good suds of hard soap, and wash the flannels in it. Do not rub woolens like cotton cloth, but simply squeeze them between the hands, or slightly pound them with a clothes pounder. The suds used should be strong, and the woolens should be rinsed in warm water. By rubbing flannels on a board and rinsing them in cold water, they soon become very thick.

Zinc Wash for Rooms.—Mix oxide of zinc with common size and apply it with a brush, like lime whitewash, to the ceiling of a room. After this apply a wash, in the same manner, of the chloride of zinc, which will combine with the oxide and form a smooth cement with a shining surface.

The telegraph line from New York to Utah is 3,242 miles. Messages to this distance have been repeated five times, the longest line being 1,200 miles. The total amount of battery used was 750 Grove cups.

The City Directory, May 1, 1862.

We have just received from John F. Trow, publisher, No. 50 Greene street, the New York City Directory, compiled by H. Wilson, being volume 76. To residents of the city this directory is as indispensable almost as the light of the sun, and to thousands out of the city it would afford business information worth ten times its cost, which is $2 50. We are much gratified to learn from the preface, in spite of the croakings of the enemies of the government, the fears of its friends, and the large number of volunteers which have gone to the war, that the number of names in the directory has increased this year. In the last year's directory the number of names was 152,825, this year it contains 153,186. In addition to the names in the regular directory, there is also added Wilson's New York Commercial Register, which contains much valuable business information.

American Railway Brakes in England.

The following interesting account of an American invention in England, is from the London *Engineer :* The mode of applying railway brakes invented by William G. Creamer, of New York, has been tried with the best results on the South-Eastern Railway, where it has been finally adopted to a considerable extent. The brakes are applied by the force with which stout springs, previously coiled, unwind themselves when a catch is disengaged. In some recent experiments with an engine tender and sixteen carriages, weighing 143 tuns in all, the train when running at the rate of 50 miles per hour, down an incline of 1 in 100 was stopped in 30 seconds and in a distance of 373 yards. When ascending a gradient of 1 in 664 at the rate of 36 miles per hour, the train was stopped in a distance of 133 yards and in 16 seconds."

The Navy.—The following are the naval appropriations contained in the bills which have passed at this session of Congress, and have been approved by the President :—For iron-cased gunboats, $10,000,000 ; gunboats on Western rivers, $1,000,000 ; naval service for 1862, $20,603,000. The sum of $22,343,113 02 for the navy for 1862-63 is contained in an appropriation bill which has passed the House, but which has not yet been finally disposed of.

California Fruits.—Among the fruits being introduced into California, and for which the soil and climate of that State are presumed to be adapted, are the European grape vines, best adapted for wine and raisins, the Mediterranean currants, the almonds of Italy and Smyrna, oranges, lemons, olives, figs, Italian chestnuts and pomegranates.

The Scientific American is the cheapest and—some people say—"the best mechanical paper in the world." We suppose this must be so or people would not keep repeating it. We do know that no other weekly journal of the kind in the world can be obtained for so small a sum ; the leading English scientific papers are treble its price per annum.

The Australian papers of March contain a sketch of a project for a new steam communication with Europe. It is proposed to construct steamships of from 6,000 to 8,000 tuns burthen, capable of carrying sufficient coals, without stopping for a supply, and of sufficient speed to complete the transit, by way of the Cape, in forty or forty-five days.

Extensive buildings have been erected at Long Beach, near Greenport, for the purpose of manufacturing oil and guano of the fish known as "bunkers," which swarm the coast of Long Island. A long wharf has been constructed, which is to be connected with the buildings by a railway. The engine used is 40-horse power.

Friends, hurry in your subscriptions for the new volume which commences in two weeks, and do not forget to speak to your neighbor about it, especially if you find him in a good natured mood. He cannot refuse so reasonable an application, if he desires to know what's going on in the great world of industry.

Vine cultivation is making immense strides in Victoria, for grapes are selling there at 4 cents per lb. The vineyards yielded, in 1861, the average of 630 gallons per acre.

Cameo Engraving.

The art of cutting cameos is a species of sculpture, rather than engraving. There are two kinds of cameos, one of which is stone of different colored strata, so that the raised figure is of a different color from the ground, the other is of the conch shell. The shells are sawed into squares with saws of soft iron, similar to those used by sculptors. After the shells are cut into suitable pieces they are ground on a stone to their required shapes, by grinding them nicely on the edges and leaving them thick in the middle. After this they must be cemented on a stick about 6 or 7 inches long, with cement of Burgundy pitch and rosin of equal parts heated together until they are perfectly amalgamated. The end of the stick is immersed in the cement while it is warm, and enough attaches itself to it to fasten the shell, which must also be slightly warmed or the two will not be attached. After being cool the shell is ready for cutting. To produce a likeness of an object, the best way is to cut the profile on paper, lay it on the shell and trace it out. The best gravers, the harder the better, are alone fit for the work, and they are ground down to different shaped points, some diamond, some oval, some chisel shaped and some round. After the likeness or design is traced on the shell it has to be blocked out with the hand, or it might be done by flat drills in a lathe. The blocking out is done by tracing the design with the diamond pointed graver, and leaving the pencilings distinct and cutting away all the outside with chisels and gouges, taking care to leave the groundwork thick enough to finish up. After the blocking out is completed, begin with the top of the profession in making the head, by leaving a space for the hair a little raised and then engraving the features, taking great pains not to do too much at a cut, for if once spoiled there is no remedy. The neck and breast are done next, as cautiously as the face. The hair is done last and is the most difficult part to perform, although the uninitiated would think it the simplest, but it is the most difficult work of all, for no matter how good the rest of the work may be, if the hair is poorly executed, the whole figure looks bad. In cutting the hair it must be gracefully curled with delicate curves. Sculptured heads are the best models for the learner to study.

After the figure or design is finished with the graver, the cameo is polished with pumice stone as smooth as possible, until all the marks of the graver disappear. It is then finished with a stiff tooth brush and potter's clay, or whiting and water, and afterward washed in pure water, when it will be observed to have that beautiful polish for which cameos are so justly admired and which has made them, on account of their chasteness of coloring, a very popular branch of jewelry.

To take the cameo off the stick after it is finished, it is necessary to heat the stick over a spirit lamp until the cement warms, when it is ready for framing.

It may be observed that the grace of a figure depends much on the drapery.

Japanning and Varnishing.

Japanning is the art of covering bodies by grounds of opaque colors in varnish, which may be afterward decorated by printing or gilding, or left in a plain state.

All surfaces to be japanned must be perfectly clean. Paper should be stiff for japanning, such as *papier mache*.

The French prime all their japanned articles, the English do not. This priming is generally of common size. Articles that are thus primed, never endure as well as those that receive the japan coating on the first operation. When they are used for some time they crack, and the coats of japan fly off in flakes. A solution of strong isinglass and honey, or sugar candy, makes a good japan varnish to cover water colors on gold grounds.

A pure white priming for japanning, for the cheap method, is made with parchment size and isinglass, laid on very thin and smooth. It is the better of three coats, and when the last is dry, it is prepared to receive the painting or ornamental figures. Previous to the last coat, however, the work should be smoothly polished.

When wood or leather is to be japanned, and no priming used, the best plan is to lay on two or three coats of varnish made of seed lac and rosin, two ounces each, dissolved in alcohol and strained through a cloth. This varnish should be put on in a warm place and the work to be varnished should, if possible, be warm also, and all dampness should be avoided, to prevent the varnish from being chilled. When the work is prepared with the above composition and is dry, it is fit for the proper japan to be laid on. If the ground is not to be white the best varnish now to be used is made of shellac. This is made in the proportions of the best shellac five ounces, steeped in a quart of alcohol and kept at a gentle heat for two or three days and shaken frequently, after which the solution must be filtered through a flannel bag, and kept in a well corked bottle for use. This varnish for hard japanning on copper or tin will stand forever, unless fire or a hammer be used to burn or knock it off. The color to be used with shellac varnish may be any pigment to give the desired shade.

To form a hard perfect white ground is no easy matter, as the substances which are generally used to make the japan hard, have a tendency by a number of coats to become dull. One white ground is made by the following composition: White flake or lead ground up with a sixth of its weight of starch, then dried and mixed with the finest gum ground up in parts of one ounce gum to half an ounce of rectified turpentine mixed and ground thoroughly together. This is to be laid on the article to be japanned, dried and then varnished with five or six coats of the following: two ounces of the whitest seed lac to three ounces of gum anima reduced to a fine powder and dissolved in a quart of alcohol. This lac must be carefully picked. For a softer varnish than this, a little turpentine should be added and less of the gum. A very good varnish and not brittle, may be made by dissolving gum anima in nut oil, boiling it gently as the gum is added, and giving the oil as much gum as it will take up. Although this varnish is not brittle, it is liable to be indented with strokes and it will not bear to be polished, but if well laid on it will not need polishing afterward. It also takes some time to dry. Heat applied to all oils, however, darkens their color, and oil varnishes for white grow very yellow if not exposed to a full clear light.

To Tin Small Articles.

To tin small articles prepare a solution of the chloride of zinc, which is done by feeding muriatic acid with scraps of zinc until it will take up no more. A strong glass bottle is the best vessel for this purpose. Let the solution settle and then decant the clear and it is ready for use. Next prepare an iron pot, of such size as will suit the purpose for the work to be done. Next put the pot on a fire and put in a sufficient quantity of tin to cover the work. When the tin is melted put in as much beef or mutton tallow as will cover it about one quarter of an inch thick, which must remain in a clear melted state, taking care not to let it get on fire. The iron, or any other metal to be tinned, must be well cleaned, either by filing or scraping, or polishing with sand. Let the article to be tinned be then wet with the chloride of zinc and carefully immersed in the tallow and melted tin, and if the article be well cleaned, it will in a very short time, be fairly and perfectly covered with the tin, when it may be taken out.

To tin a piece of plated metal, say a piece of copper plated on one side with silver, prepare a paste, which may be of common pipe clay, and a very little wheat flour wet up with water. Then take a soft brush and lay an even coat of the paste over the silver side and lay it in a warm place to dry; then when dry it may be immersed in the pot of melted tallow and tin as already described, and the copper side will be covered with tin, but the silver will be protected from the tin by the paste, which may be removed by washing in water.

To Make Steel.—Take wrought-iron clean scraps of any kind one hundred pounds, black oxide of manganese 1 pound, and 2 pounds of ground charcoal, put this in a crucible with a lid fitted and luted tight to prevent the carbon from escaping, and submit to the action of intense heat for some time; afterward pour it in molds, which must be warmed and greased to prevent the metal from sticking. It requires practice to make the metal sound, by taking it from the furnace at the proper time. It is afterward submitted to the trip hammer to close the grain.

Fine Cotton Yarn and Cloth.

Some idea may be obtained of the perfection of the cotton machinery used in England, by some statements obtained from a letter published in the Manchester *Guardian*, from H. Houldsworth, manufacturer of fine yarn. It has been stated that the fine cotton yarn spun in India by female hands is finer than that spun by machinery in England. We are informed this is not the case. Mr. Houldsworth examined the finest piece of Indian muslin exhibited in London in 1851, and found that it measured ten square yards, weighed 1,507 grains, contained 104 warp threads and 76 weft threads to the inch, the number being what is denominated No. 357. At the same exhibition No. 400 English yarn was shown, but at the present exhibition in London there is a piece of muslin, woven in France from No. 700 yarn spun in Manchester, which exceeds anything ever before attempted. It is a mere fancy specimen, however, and not fit for practical purposes. On the other hand, there is a whole piece of cloth of about thirty yards in length, made of No. 440 yarn. This cloth was also woven in France, but the yarn was spun in England of Sea Island cotton. The fine muslins of Hindostan have been called in oriental style "woven wind," but they are evidently coarse compared with the finest specimens that have been woven in France. Mr. Houldsworth states, as an item of curiosity, that a few threads of No. 2,500 have been made, but they are of no practical use. A single fiber of Sea Island cotton is equal in fineness to No. 8,000 yarn, and a pound weight of it in a single fiber of thread would measure 3,818 miles in length.

A Good Word for the Skunk.

The *American Agriculturist* takes up the cudgels in defence of the poor, despised, but seldom-kicked skunk, and gives him a good notice. Our cotemporary says:—

"All summer long he roams your pastures at night, picking up beetles and grubs, poking with his nose potato hills where many worms are at work. He is after the grubs, not the tubers. He takes possession of the apartments of the woodchuck, who has quartered himself and family upon your clover field or garden, and makes short work with all the domestic arrangements of that unmitigated nuisance. With this white-backed sentinel around, you can grow clover in peace, and the young turnips will flourish. Your beans will not be prematurely snapped, and your garden sauce will be safe from other vermin. The most careless observation of his habits shows that he lives almost exclusively upon insects. While you sleep he is busy doing your work, helping to destroy your enemies. In any fair account kept with him the balance must be struck in his favor. Thus among the animals we often find friends under the most unpromising appearances, and badly abused men are not unfrequently the benefactors of society."

This all may be very true and we have no doubt it is, but nevertheless we cannot forgive the rascal for certain attentions which he once bestowed on some of our neighbors. The eccentric John Randolph once said, he "would any time go half a mile to kick a sheep." So with us in reference to a skunk if we dare.

Preserving Animal Substances.—Putrefaction requires the presence of water; hence, by drying animal substances, they are preserved. Putrefaction is impossible above 182° or below 32°. Freezing acts precisely as drying. Hence bodies preserved by frost, and those which remain fresh for years after death on the Arabian deserts, are preserved from the same essential cause.

Preserving Butter.—Take two parts of the best common salt, one part of sugar and one part of saltpeter, and blend the whole completely. Take one ounce of this composition for sixteen ounces of butter, work it well into a mass and close it up for use. Butter thus cured requires to stand three weeks or a month before it is used.

The Hartford Manufacturing Company of Plated Ware, received on the 30th ult. a large order from one of their old customers in New Orleans. This is the first order from that city since March, 1861, when the secession frenzy broke out.

Correspondence

EDITORIAL CORRESPONDENCE.

Wheeling--Its Manufactures—Mines--Suspension Bridge, &c.

WHEELING, May 29, 1862.

In proceeding from Columbus, Ohio, to Wheeling, Va., part of the train is switched off at Belaire, to go round by Wheeling, and part of it proceeds direct to Mingo Junction, a few miles below Steubenville, where the two sections of the original train are again united into one, which then goes on with one engine to Pittsburgh. By this arrangement several important towns in the Ohio valley are provided with daily railway communication between the west, *via* Cincinnati, and the east and north by Pittsburgh. In proceeding up the valley of the Scioto, extensive plains, covered with the promise of a most abundant harvest, are seen as far as the eye can take in the distant landscape. So permanently fertile is this valley, that I was shown large fields in which corn had been yearly planted for half a century, and yet no diminution of yield has ever been experienced. The quantity obtained ranges from 40 to 70 bushels per acre. As the agricultural exports of a State afford a very fair index of its wealth and capacity, the following statistics of Ohio for 1861 will show how it stands :—

Flour, bbls.	2,446,931
Wheat, bush.	7,398,868
Corn, bush.	5,622,802
Other grain, bush.	293,425
Beef, bbls.	52,613
Cattle, number.	290,187
Hogs (including packed), number.	1,117,161
Wool, lbs.	4,397,081
Cheese and butter.	9,410,420

The annual average value of the agricultural products of Ohio for the past six years, has been no less than $130,000,000.

Most of the interior of Ohio is flat, and appears to be a great limestone basin, but coal is found in all the hilly country toward the north, south and east. The term coal basin is so frequently used, that many persons suppose coal is only found in valleys, and at a considerable depth in the earth. Here the coal fields deserve the name of coal hills, as coal crops out of almost all the cuts made for the railroads ; and it may be noticed in the face of many of the deep ravines, where it is mined by driving in a slightly inclined horizontal tunnel.

We have arrived at Wheeling, Va., a place famous for stirring incidents in Indian warfare, but now better known for several branches of manufacturing industry. It is situated on the left bank of the Ohio river, and extends, in a scattered manner, for several miles along the river. It contains about 23,000 inhabitants, has several respectable buildings, is apparently a thrifty place, and has an enterprising and frank population. Directly behind it the hills rise to an elevation of about 600 feet, and I was charmed with the view from one of them in the early morn, when the Ohio valley, with its winding river, was seen to a great distance, and the city was lying in quietness below. On the other side of the ravine before me, a friend points out the rock, with the deep cleft under it, where Louis Wetzel shot the crafty Indian, Red Turkey, who had decoyed and slain quite a number of the old pioneer hunters. About half a mile distant from this I am also shown the precipice over which Capt. McCulloch leaped and escaped, when pursued by Indian foes.

Wheeling has seven large rolling mills, also seven foundries, three nail works, two glass manufactories and several establishments for making wagons, carriages and ambulances. The advantages of Wheeling for manufacturing, chiefly depend on its water communication, and the abundance, cheapness and quality of the bituminous coal found just behind it in the hills. Each mill has its coal mine. At the Crescent rolling mill, for example, where railroad iron is manufactured, a tunnel is driven into the face of the hill, where the coal is mined and thence descends on quite a short incline into the very mill. The seam of coal is about five feet in thickness ; it is mined for 18½ cents for half a load of 12½ bushels ; and is retailed at 6 cents per bushel. The lower portion of this seam of coal contains a great deal more sulphur than the upper portion, hence the "top coal" is prized for domestic purposes, and for use in iron furnaces. A mine is ventilated by driving in a counter tunnel to the main working one, but communicating with it. A fire is kept burning in the counter channel, and the fresh air to supply combustion passes through the rooms in which the miners operate, thence out by the fire tunnel. A proprietor of one of the flint glass manufactories informed us that a fan operated by the steam engine, had been tried for some time, in ventilating their coal mine, but it was given up, for the old fire system of ventilation. The mine is ventilated day and night, and also on Sundays, by simply keeping up the fire, whereas a fan requires an engine to be kept constantly in operation. Wheeling enjoys a high reputation for its railroad iron, nails, flint glass and iron castings. Hamilton & Clark have just finished a government contract for 300 tuns of 13-inch mortar shells. Each weighs 216 lbs., and the thickness of metal is 2½ inches. The government test for these shells is very severe. Each is measured with two ring gages, and also with calipers, and finally passed through a cylinder. The thickness of each must be uniform to the $\frac{6}{100}$ of an inch, or it is rejected. There is no iron ore in Wheeling. That which is obtained for use comes from the iron mountain in Missouri. Laurence county, Ohio, also supplies some iron.

In the middle of the river is a somewhat extensive island, forming part of the city of Wheeling. It is joined to the Virginia shore by Ellett's famous suspension wire bridge, over 1,000 feet in length. From the island to the Ohio shore the river is crossed by a truss bridge. The steamboat people of Pittsburgh entered a suit some years since in the United States Circuit Court against this bridge, as a nuisance. The specified complaint was, that during high water, steamboats having tall funnels could not pass under it. A great many experts were examined on the trial, the object of the pursuers being to show that long funnels were *necessary* to good natural draft in the furnaces of the steamboats on the river, and that the bridge prevented the use of such funnels. The result of the trial was that the bridge was solemnly declared to be a nuisance by the court—an obstruction to the free navigation of the river—and it was only saved from being taken down by Congress passing a bill making it a Post Office route. After all, not a single steamboat has been prevented from running on the river by it ; a jointed funnel can be lowered in a few seconds, and thus a much lower bridge can be easily passed. This noble suspension bridge still stands, a monument of Charles Ellett's engineering skill and daring, and over it we will soon be passing on our way up the valley to Steubenville and Pittsburgh.

OUR SPECIAL CORRESPONDENCE.

A Prisoner's Rations—The Way the Bull Run Prisoners were Taken—Their Long Confinement and Happy Release—Prosperity of New England Manufacturers—No Distress in Consequence of the War—Great accumulation of Fine Goods—The Stock of Cotton Almost Exhausted.

PROVIDENCE, June 4th., 1862.

MESSRS. EDITORS :—On board of the magnificent steamboat *Metropolis*, on Tuesday June 3d, were a number of released prisoners who were captured by the rebels at the disastrous battle of Bull Run. They had been in prison ten and a half months—weary months they were—and were most happy at having obtained their release. One of them, an intelligent and cheerful young man from Maine, had in his haversack one of the rations with which the prisoners were supplied twice a day at Tuscaloosa in Alabama. It was a lump of corn bread about three inches long, two wide and two thick. Besides this twice a day they had a piece of bacon as large as a man's two fingers once a day. This kept them a little hungry, but considering their want of exercise was probably good for their health. I could not help sympathizing with their long and weary confinement. The young man said that most of the prisoners were taken while helping off the wounded. About 400 came at this time, and the remainder (some 600) were soon to follow.

Though the cotton manufacture, in which this city of Providence is so largely interested, has been somewhat checked by the war, the business for the past year has been very profitable, especially for concerns that had large stocks of cotton. There are very large stocks of fine goods accumulated in the hands of some manufacturers, and I venture the prophecy, that the longer they are held, the less they will bring. It seems to me to be one of those epidemic delusions that so frequently pervade the business world. The stock of cotton is almost exhausted, and unless the state of affairs is very soon changed by the military operations, nearly all of the mills will soon be closed. A very large portion of the men have gone to the war, thus giving employment to men who would otherwise have been idle. One large manufacturer told me that he had 80 men at work in one weaving room, and 50 of them have gone to the war. They were nearly all Englishmen. Though the English nobility, and the English government which is in the hands of the nobility very naturally sympathize with the great slaveholders who got up this rebellion, the hearts of the great mass of the English people are with the North.

The extensive jewelry establishments of Providence have nearly all suspended operations in consequence of the war, but many of the other manufactories are in operation, and new ones have been created by the war, especially those of sabres and rifles. If I can find anything of interest among any of these I will give you an account of it. B.

On the Cleaning and Preservation of Engravings.

BY AUG. A. HAYES, M. D., STATE ASSAYER OF MASSACHUSETTS.

The frequent inquiries addressed to me by those who possess valuable engravings—which have become damaged through accident, or exposure—respecting a mode I adopted successfully for restoring some very fine ones, induce me to publish in the widely-read pages of the SCIENTIFIC AMERICAN, a general process applicable to the largest number of cases.

Any one who will incur the trouble of looking up in the older print shops, and depositories in residences in this country, will find abundance of defaced engravings of rare merit—the works of the best masters rejected, which can be restored easily to quite their former degree of freshness and beauty. All who have studied the better efforts of the old artists, in giving permanency to their conceptions in this department of art, assign to it a very high place, and it may be suggested that a higher cultivation and enjoyment of design and execution, in so far as the influences of light are concerned, may be gained from careful observation of engravings, than can result from time bestowed on paintings, which often command public admiration, or are the so-called gems of an exhibition.

In commencing to restore an engraving some attention must be given to the kind of injury it has suffered. A general brown color, more or less deep, resulting from atmospheric action only, is the least possible change. Spots and stains caused by ink, colored fluids, oil or insects, must be first treated and all pencil marks removed by india rubber or bread crumbs. A fluid acid, obtained by dissolving one ounce of crystals of oxalic acid in one-fourth of a pint of warm water, may be used for application to all stains, and the paper should be wet with it thoroughly where spots of any kind exist. Excepting in a few cases, this acid will not cause the removal of stains immediately, but generally it combines with the bases of them, and they are removed by subsequent steps ; the thorough wetting should be done a few hours before proceeding to clean the engraving.

To facilitate handling and for the protection of the edges of the paper, a piece of millinet, or the stiff open fabric formerly sold for ladies' skirts, should be roughly sewed around one stick at each end, so as to form an apron, like a chart attached to two rollers, the cloth of which must be an inch larger than the largest print to be handled. From one to ten prints of even large size may be cleaned at one time, after they have been wet on their spotted parts with the acid, and evenly spread on the apron, so as to allow of the immersion of the whole in water. A tub of the ordinary size will allow prints of considerable surface to become immersed, but the most desirable resort is a common bathing vessel, so nearly filled with warm water that the bent paper supported by the open texture can rest on the bottom and sides, where it should be allowed to remain with occasional

raising of it and moving it by means of the stick handles, from twelve to twenty-four hours.

On the first trial a degree of alarm will be felt in the case of a highly-prized favorite, at this seemingly careless treatment; but it must be borne in mind that paper is a firmly felted mass of short fibers, which may be soaked in various fluids for weeks and resist all diluted acids and most chemical agents for a long time while wet, if not exposed to mechanical abrasion by touch, or rapid motion. The strong paper of engravings absorbs much air, which resists the penetration of the water, and motion is necessary to remove this as well as to allow the colored solutions formed to pass away. This motion may be given by holding the supporting sticks and passing the mass from end to end of the bath, or slowly up and quickly down, enabling the sheets to become separated momentarily. Discolored water may be drawn off, the apron and contents resting on the bottom and sides, and fresh water be slowly admitted to replace it. Cold water can be substituted for warm, longer time being allowed for its action. When the prints no longer add color to the water after being agitated, the water must be withdrawn and replaced by such a portion as will barely cover the paper. Half a pound of bleaching powder (chloride of lime) mixed to a paste first in cold water, and then added to two quarts of cold water and well stirred from time to time for six hours, will afford a nearly clear fluid, resting on a white deposit in the earthen ware vessel chosen. A portion of the clear part of this fluid, must be added to the water in the bath, until both taste and odor denote the presence of chlorine in the water. Motion being given to the paper the bleaching effect of chlorine will be perceived, or its odor in the water will have been lost; when more must be added so that the odor or taste of chlorine must be present in the water two or three hours.

The action of the chlorine on the parts previously wet with acid will remove nearly every kind of discoloration, while the brown hue of the paper giving place to perfect whiteness, the light and shadows of the engraving become of their original perfectness, and the picture will be as distinct as when it was first impressed. It has happened, in a few trials, when the prints were long stained, they did not yield to the weak chlorine water, that resort was had to a little mineral acid to develop free chlorine in the bath. One ounce of muriatic acid was added to one pint of cold water and the weak acid thus formed mixed in the water of the bath, soon caused the bleaching of every fiber in the paper.

After the bleaching the water must be drawn off, the paper drained, fresh clear water admitted and the paper moved through the water to thoroughly wash away all adhering chlorine. Several quantities of water may be used, the paper being each time drained, and finally the whole mass, raised by the handles, may be placed on a clean white-wood table or board to drain. If a number of prints have been treated, the wet mass may be placed in a warm room, or air may be admitted, and as the one on the top of the pile becomes more dry than the rest, it may be removed to any support and left to dry. In hastening the drying I have extended ordinary bed sheets and spread the wet prints singly on these; slow drying rendering any pressing unnecessary.

Those having the usual presses might prefer to press the still damp sheets, and where only two or three prints are the subjects of trial the substitution of other vessels and ready appliances will occur to any one.

This description is given in detail purposely, although unnecessary, so far as the process is concerned, because I wish to impress on the mind of any one who possesses an injured engraving, that it can be restored to its original value without the expenditure of much attention; and it must not be the conclusion, from reading this process, that great care is required, for time is insisted on rather than attention. The few dispositions being made, not the slightest care need be given to the matter; if the bath can be spared, the odd minutes of a week will enable one to restore dozens of specimens and give permanency to their beauties.

16 Boylston street, Boston, May 30, 1862.

The German ocean has recently overflowed 10,000 acres of fertile land in Norfolk County, England.

Casting Guns Hollow.—Their Length.

Messrs. Editors:—I have read attentively your extracts from Capt. Benton's compilation of instructions on ordnance and gunnery. I particularly noticed reports of experiments made in France to demonstrate the maximum charge and 1,320 feet velocity result; also I noticed the effects of length of bore on the maximum charge in proportion to the weight of the projectile and the proper or most favorable length of piece in proportion to the caliber, is given, all of which, I suppose, is mainly correct, except to meet the present emergencies of iron-clad ships greater length in piece in proportion to the caliber no doubt is requisite, thereby increasing the maximum charge of powder, giving greater range, which is penetration.

But what is proposed to meet this pressing necessity for increased attacking force? Why, Captains Rodman and Benton and coadjutors of the Ordnance Department have moderately proclaimed to the country a wonderful discovery—a mode by which 15-inch guns could be cast, and even 20-inch guns cast upon hollow cores, cooled from the center. Well, did not every well-informed mechanic know that 20-inch guns and even up to 36-inch caliber, were cast upon cores cooled from the center with hot air confined around the outside, during a gun mania that pervaded the world three or four hundred years ago? Every engineer and skillful iron worker in this country knows that large cylinders must be cooled from the center, and for that purpose removes the core to let in cold air, which cools quite as fast as the good of the metal requires. He also knows that no system of cooling so large a mass of cast iron as is requisite to make a 20-inch caliber gun sufficiently strong to bear a maximum charge of powder (which should not be less than one-half the weight of the projectile), can be depended on. According to Capt. Benton's reports, heavy ordnance should have 20 calibers in length. I will venture the opinion, and challenge the world for a refutation, that to attain the great range or crushing power we are now after, as a specialty for naval attack and coast defence, we should have at least 25 calibers in length—more if we can get it—and sufficient strength to bear at least one-half the weight of the projectile in powder. The gun should have at least 200 lbs. to 1 lb. of ball; then you will have a gun that will throw a shot through the *Monitor's* "cheese box" or through both sides of the British *Warrior*. Such a gun can be built of cast iron with relays of wrought iron; cast iron alone would not be safe. Capt. Rodman's absurdities would require 30 to 40 feet in length at least and 100 tuns in weight; all the weight he now has can be advantageously used in a gun of 10-inch caliber.

You say the *Monitor* had 11-inch guns, firing shells of 169 lbs. and 12 lbs. of powder. Those 11-inch guns should be strengthened to bear at least 75 lbs. of powder and they would have sent their shot through both sides of the *Merrimac*.

You say Rodman's 15-inch gun has been fired 500 times with 30 to 50 lbs. of powder—Capt. Benton says 40 lbs.—giving initial velocities varying from 902 to 1,328 feet per second. Now, Mr. Scientific, there must be some typographical error here; in Capt. Benton's excellent work he gives the result of 1,320 feet, where the maximum charge equaled the weight of the ball. I believe 1,300 is about the maximum claimed in England and France when using maximum charges of powder. That Capt. R. is attaining 1,328 feet with less than one-eighth the weight of his ball in a 15-inch caliber, in a gun about 12 calibers long, is a statement the engineers of this country beg to be excused from accepting without accompanying vouchers; and that 40 lbs. powder is a test for a 15-inch gun, is assuming more than the public are prepared to accept. It may sound very well for Capt. R. to say, in his official report, the gun is not half tested; greater ranges and greater velocities and double the amount of gas it is capable of enduring, in his opinion. He knows perfectly well that a short piece, proportionate to its caliber, cannot burn powder sufficient to supply a large amount of explosive force sufficient to give the ball a great range. Civilians who preside in the Ordnance Department and in committees in Congress are not to be expected to have practical knowledge on these subjects. The great power for defence in this country is in its mechanics. Give them a chance to unite their skill and furnish them the means, and you evoke a power in this country greater than is possessed by any other nation.

I know I am expressing the views of a numerous class of engineers and mechanics who dare not speak for fear of offending. M. Stoddard.

Buffalo, N. Y., June 5, 1862.

The Figures on Dress Parade.

Assuming an army of 600,000 men formed into line, single rank, they would show a front of 23 miles, allowing two feet to a man, which is rather close packing for free movements. We will countermarch one-half—the right wing—and place them as a rear rank (the usual formation), and we have a front of 11½ miles, which distance they would require when marching in column of platoons. Should the generalissimo wish to make a rapid inspection, if he had the appliance of a parallel railroad track and a fast locomotive, he may run down in front of the line in a quarter of an hour, and make a hasty review. If mounted on his charger, at a smart trot, it would require over a half hour. This respectable army, formed in hollow square (in double rank) would be nearly three miles from side to side, showing on each front a fraction under three miles. The inclosure would contain about 5,760 acres, an area equal to some immense Indian corn-fields in Illinois. When marching in column it would require a whole day, taking the thing easy, for the extreme left wing to reach the point left by the right wing in the early start. When we add the commissariat, artillery, ammunition, and other wheel transports, we must give the army two whole days before the left wing *debouch* from the starting point of the right wing. If this immense army were formed in a solid square, allowing about four square feet for a man, they would cover about 150 acres, and form a block of bayonets a fraction under a quarter of a mile square. Estimating each man as carrying weight of musket, equipments, rations, &c., at fifty pounds, this army will have trudged along with 15,000 tuns weight. Allowing two pounds of provisions per diem for each man, they consume 600 tuns per day, and if they consume one quart of water per day, which is the best drink for an army, they consume 150,000 gallons—say 1,200 hogsheads—which is a clever sized shipload each day.

Disinfecting Agents.

Now that warm weather is approaching, our citizens should thoroughly cleanse their premises, rendering them as pure and healthy as possible. We are convinced that a great portion of the diseases so prevalent during the hot months in summer, is attributable to the accumulation of filth in alleys and yards. There are a number of disinfecting agents which will be found efficacious in removing offensive smells from damp, mouldy cellars, yards, pools of stagnant water, decaying vegetable matter, &c. Either of the following will answer the purpose, while they cost but a trifle.

1.—One pint of the liquor of chloride of zinc, in one pailful of water, and one pound of chloride of lime in another pailful of water. This is perhaps the most effective of anything that can be used, and when thrown upon decayed vegetable matter of any description, will effectually destroy all offensive odors.

2.—Three or four pounds of sulphate of iron (copperas) dissolved in a pailful of water will, in many cases, be sufficient to remove all offensive odors.

3.—Chloride of lime is better to scatter about damp places, in yards, in damp cellars, and upon heaps of filth.

Medical Use of Malt in Germany.—It would appear, the London *Lancet* states, that German physicians have been for some time past using malt in bronchitic and dyspeptic affections with some benefit. The solution of malt, after one hour's maceration in water at 75° Cent., is peculiar, inasmuch as gluten is found in it in a dissolved condition. Malt is being used in the form of powder taken into the stomach, or added to warm baths, and also to make a kind of beer. M. Fremy, of Paris, has tried these preparations, and states in the *Moniteur des Sciences* that he considers them as excellent tonics.

To remove the stains on spoons caused by using them for boiled egg, take a little common salt moist between the thumb and finger, and briskly rub the stain which will soon disappear.

ORDNANCE IN THE LONDON EXHIBITION.

From a long article on the subject of ordnance in the London *Engineer*, we take the following extracts :—

When Mr., now Sir William, Armstrong first turned his attention to guns it was as a mechanical engineer, and it was the same with Mr. Whitworth. Whatever those gentlemen have accomplished has been in the way of improved construction only. If there be any invention in the Armstrong gun it is in the invention of Captain Blakely, or, to go further back, of Professor Treadwell, of the United States, or even, perhaps, that of Mr. Peter Rothwell Jackson, of Salford. Captain Blakely proposed, and, luckily, patented the use of coils shrunk successively upon an inner tube of cast iron, brass, or steel, as early as 1855, or two years before the then Mr. Armstrong had taken up the plan. In the United States, however, Professor Daniel Treadwell not only made cannon nearly twenty years ago, with welded coils shrunk successively upon an inner tube, in some cases of wrought iron and in others of steel, but he published a pamphlet on the subject, one which, dated 1845, is still in existence, and in the hands of military men in London. But on the 6th November, 1834, Mr. Jackson, of Salford, patented a mode of constructing cylinders for hydraulic presses by successfully shrinking wrought-iron or steel hoops upon a thin cast iron cylinder. Mr. Jackson in the same year made a press the cast iron portion of which was 19½-inches bore and ¾-inch thick, and successively shrunk on three series of wrought-iron hoops, each 2-inches in thickness, thus making the walls of the cylinder 6¾-inches in total thickness. This press has been in use ever since, and Mr. Jackson has informed us that it will bear a strain of 10 tuns per square inch, or 3,000 tuns in all. The hoops are not coils, it is true, but plain rings, and it is only in this respect that the mode of construction differs from that of Captain Blakely, whose patent completely forestalls the Armstrong system, except only in the injudicious practice, pursued at Woolwich and Elswick, of making the inner tube of wrought iron instead of steel. Mr. Jackson was anxious, twenty-eight years ago, to apply his system to the construction of heavy guns, but his friend, the late Mr. J. G. Bodmer, who has met with no success in introducing his own plans to the notice of government, dissuaded him from the attempt.

With these facts, therefore, we cannot magnify our present class of rifled ordnace into anything like a great or recent invention. The Armstrong and Whitworth guns in the Exhibition are remarkable chiefly for the excellence of their workmanship, and to this is due the great range and precision which they have attained. They are at the same time costly, and, in some important respects, faulty in construction. This, although perhaps sufficiently known to our readers already, will be shown presently.

It is to be regretted that Mr. Whitworth did not send a sample of his .12-pounder breech-loader, as it was with a gun of this description that, in an official trial on the 2nd of April, 1861, results very much superior to those afforded by the same class of Armstrong gun were obtained. As we have noticed the construction of the 12-pounder Armstrong, it is as well to give its maximum performance ; and, as this was obtained in a trial with the Whitworth gun, the practice with both may properly be given together.

According to the report of the Ordnance Select Committee, the trials took place April 2, 1861, the following being the data and results :—

Armstrong breech-loading 12-pounder, No. 6, weight 8 cwt. 2 qr. 11 lb., length 7ft. 6in.

No. of rounds.	Charge lb.	Elevation, deg.	Mean range, yards.	Mean observed deflection, yds.	Mean time of flight.
Five	1¼	2	1,130	4	3·4 sec.
Five	1¼	2	1,256	5	3·6 "
Five	1¼	5	2,146	9	6·8 "
Five	1¼	5	2,358	11	7·3 "
Five	1¼	10	3,568	12	9·8 "
Five	1¼	10	3,908	17	12·9 "

Whitworth breech-loading 12-pounder, No. 1, weight 9 cwt. 3 qr., length 8ft. 8in. hexagonal bore rifled to make one turn in 4ft. 7in.

No of rounds.	Charge lb.	Elevation, deg.	Mean range, yards.	Mean observed deflection, yds.	Mean time of flight.
Five	1¼	2	1,198	1½	3·5 sec.
Five	1¼	2	1,289	1½	3·4 "
Five	1¼	5	2,367	1½	6·9 "
Five	1¼	5	2,471	1½	7·0 "
Five	1¼	10	4,222	3	10·2 "
Five	1¼	10	4,399	6½	13·1 "

It will thus be seen that Mr. Whitworth's gun gave the best results. This was due to the mechanical fit of his projectiles to the bore of his gun, no forcing or stripping of a lead-coated shot, like Armstrong's, being involved.

The Whitworth Rifle and Ordnance Company, of Sackville street, Manchester, exhibit a handsome 1-pounder muzzle-loading rifled cannon, mounted on carriage ; a 6-pounder muzzle-loading rifled cannon also mounted ; a 6-pounder breech-loading rifled cannon without carriage ; a 12-pounder brass rifled field-piece ; a 32-pounder and a 70-pounder rifled ship's cannon. All these guns have bores hexagonal in cross section, the projectiles being planed to correspond. The pitch of the rifling is, in all cases, 20 diameters of the bore. Mr. Whitworth, we believe, employs mild steel, or "homogeneous metal," for the inner tubes of his larger guns, those of smaller bore being made wholly of "homogeneous iron," so called. In making his larger guns Mr. Whitworth takes a tube of this material, and turns it so as to have an external taper of about an inch. Upon this a series of hoops of fibrous iron, as employed by Mr. P. R. Jackson, are forced on cold by hydrostatic pressure. Each hoop is about 20-inches long on the gun. All the hoops are put on with the greatest amount of pressure they will bear without injury. A second series of hoops, breaking joint with the first, is forced on over them, and thus the larger guns are made up. For the hoops next the breech Mr. Whitworth has sometimes used puddled steel. It is Mr. Whitworth's opinion, frequently declared, that large guns may be made wholly of "homogeneous metal," a material which is practically identical in everything, except cheapness, with the mild steel we have so long advocated for guns.

The standard charges of powder in the Whitworth guns are generally one-sixth the weight of the projectile, the Armstrong charges being only one-eighth of the weight of the shot. The average ranges obtained with the Whitworth 12-pounder at 2°, 5°, and 10° of elevation, have been already given. With a 12-lb. shot, and 1¼ lb. of powder, the average range, at 20° elevation, is 7,000 yards, and at 35°, 10,000 yards, or nearly six statute miles. Mr. Whitworth also exhibits one of the flat-fronted projectiles which were fired through the armor plates and side of the *Trusty* during official trials at the Nore. Besides these are hexagonal shot and shell, ranging from 1 lb. to 70 lb. weight.

The largest gun in the Exhibition is that made by the Mersey Iron and Steel Company, of Liverpool, and named the Prince Alfred. This is a wrought iron, muzzle-loading rifled gun, forged hollow by a process patented six years ago by Mr. William Clay. The gun is 12 feet long, 35-inches in diameter at the breech, 18-inches at the muzzle, 10½-inch bore, and weighs 10 tuns. The rifling consists of twelve shallow grooves, making one turn in 30 feet. Before being rifled it was fired with a 140 lb. ball, and 30 lb. powder, against a target of 4½-inches iron plates, backed with timber and sand. The plate was indented 6-inches, but not actually penetrated and is exhibited along with the gun, as is also (or was for a short time) the 4½-inch plate, shattered in 1856 by the 13-inch Mersey gun, firing a 280-lb. shot. The Mersey Company also exhibit Col. Clay's 12-pounder breech-loading rifled gun, of 3-inch bore, with 15 shallow grooves. This piece, it is stated, has been fired 19 times a minute, with a great escape of gas, we do not doubt, at the breech, which is not such as is likely to give a good fit.

The next largest gun is that of Herr Krupp's, of 9-inch bore, and weighing 9 tuns, a single mass of cast steel, and by far the largest gun of that material ever made. It is, however, hardly more than a steel forging, bored and rough-turned, for, although open at both ends, no breech-loading arrangement is shown, nor has the bore been rifled. Herr Krupp also exhibits a 100-pounder, a 68-pounder, a 40-pounder, a 25-pounder, and a 25-pounder steel gun, each in the same stage of finish as the 9-inch gun. He also sends a 4-pounder muzzle-loading rifled cast steel gun.

Captain Blakely exhibits a 200-pounder cast iron gun, strengthened on his principle, and weighing 7 tuns. It is a muzzle-loading gun, with an 8½-inch bore, rifled with three grooves on Commander Scott's "centrical system." The makers of the gun are Messrs. Fawcett, Preston & Co., of Liverpool. The gun is hardly as well strengthened as we should suppose Captain Blakely would have it, if called to a contest with the heavy Armstrong gun, yet there can be no doubt that the wrought-iron coiled jacket extending from the trunnions to the base ring affords great additional strength, shrunk on as it is with a considerable degree of tension. Captain Blakely's system, besides its imitation by Sir William Armstrong, has been adopted by the Spanish, and to some extent by the French governments. The Confederates have also purchased many Blakely guns, and the Federals have employed the same plan for strengthening cast-iron guns, which, thus jacketed, are known as "Parrott guns," from the name of the maker, Mr. R. P. Parrott, of West Point. Captain Blakely also exhibits a 9-pounder cast steel gun with 8 grooves.

Mr. Lancaster exhibits an oval-bore cast-iron gun of the 95 cwt. class, doubtless a 68-pounder originally. It is stated to have fired 604 rounds at angles of above 12° of elevation. A smaller oval-bore gun is exhibited with it. The initial velocity of the shot from the large Lancaster guns, where the charge is one-fourth the weight of the projectile, is given as 1,650 feet per second.

Commander Scott, R. N., exhibits the muzzle of a 32-pounder, as rifled on his centrical system.

Mr. P. M. Parsons, of Arthur street East, exhibits a wrought-iron gun with a novel arrangement for loading at the breech.

Mr. Bessemer exhibits a 24-pounder gun in the rough, and another of the same rate in the finished state. That in the rough is a solid forging of Bessemer steel, forged from an ingot 18-inches square and weighing 28 cwt. Both are examples, on a small scale, of the ordnance which we have so long advocated as the cheapest and strongest for the purposes of modern warfare. The material may be produced actually at a less cost than wrought iron in the same shape, while the former has nearly double the strength of the best Lowmoor iron, and, being completely fusible, may be obtained in perfect soundness and homogeneity. It is to be regretted that Mr. Bessemer has not yet found it convenient to give a demonstration, on the largest scale, of the capabilities of his material for ordnance, but the time when it will be conclusively tested cannot be far distant. He exhibits some improved projectiles, which we have noticed on former occasions.

Altogether the Exhibition is particularly full in respect of ordnance, the examples shown illustrating a wonderful improvement in construction, or, more strictly, in workmanship, over any known eleven years ago.

The first number of the Scientific American was issued August 28, 1845 ; it contained engravings and short notices of the long railway carriage now so commonly used, the iron steamship *Great Britain*, Signor Muzio Muzzi's traveling balloon, and also the noble head of George Washington. Its contents are a medley of poetry, crude science, rational religion and miscellaneous items. The editor announced, in his opening address, that he was called upon from the South and West to undertake such an important work. We suppose it safe to say that not more than five hundred copies were issued of the first number. It is now the most widely circulated journal of the kind in the world.

Changeable Fire-Screen.—Draw a landscape on paper, with India ink, representing a winter scene, or mere outline, the foliage is to be painted with muriate of cobalt for the green, acetate of cobalt for blue, and muriate of copper for yellow, which, when dry, will all be invisible. Put the screen to the fire, and the gentle warmth will occasion the flowers, &c., to display themselves in their natural colors, and winter be changed to spring. When it cools, the colors disappear, and the effect can be reproduced at pleasure.

There are seventy rivers in Canada in which salmon is caught. About 10,000 barrels of this fish are exported annually from the Bay of Chaleur.

English bar and bolt iron is selling at Liverpool for £5 10 (about $27) per tun. The best Staffordshire is selling at £7.

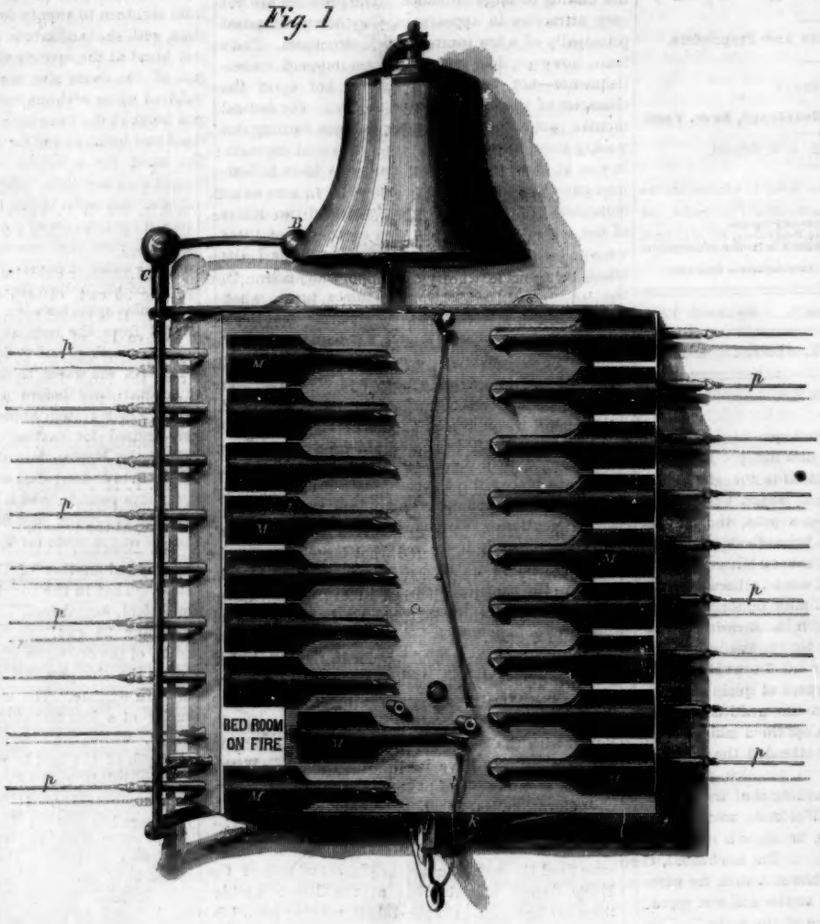
Scotch pig iron is selling at Glasgow at about $18 per tun.

Improved Fire Alarm.

Samuel D. Cooper, of this city, has invented and patented an apparatus for an instantaneous alarm to the inmates, on the first beginning of a fire in any part of a building. A bell of suitable size is so arranged in relation to a hammer and coiled spring that the unwinding of the spring will ring the bell. Wires lead from the apparatus to every room in the building, where they are so connected with strings that when a fire occurs the wires will be released, in their turn releasing the spring, when the bell will be rung for a long time with great violence, awakening a person in the room, or indeed any one in any part of the building.

The apparatus is not complicated and will be understood by an examination of the engravings, of which Fig. 1 is a front view, and Fig. 2 a view of the interior with the back plate removed. A is the bell, and B the hammer attached to an arm on the rock shaft, C. This shaft has at its lower end an arm, *d*, which enters a slot in the end of the rod, *e*. The rod, *e*, is pressed outward by cams, *f f f*, and withdrawn by a spiral spring wound around it. This reciprocating motion, it will be seen, rocks the shaft and rings the bell. The cams, *f f f*, are upon the shaft of a spur wheel which meshes into the teeth of the wheel, G, and this wheel has upon its shaft a drum around which a cord, *h*, is wound; the cord passing also around the drum, I, of the coiled spring.

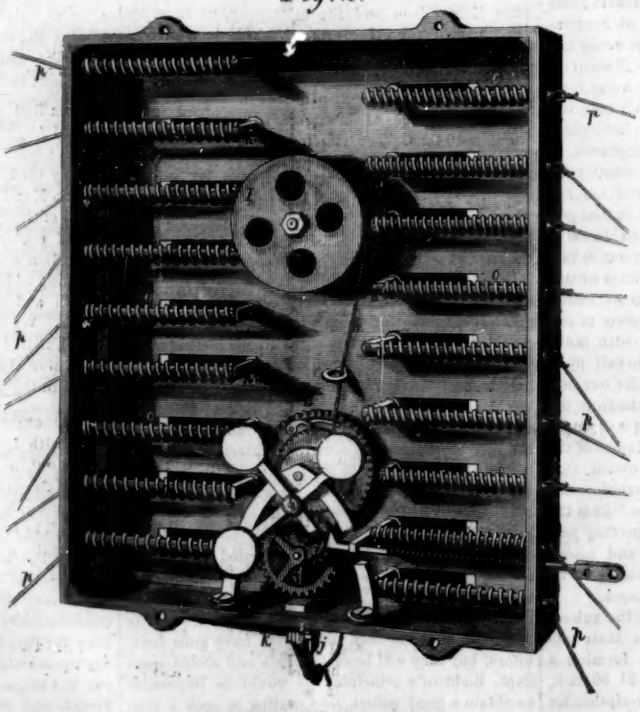
Fig. 1



The wheel, G, is turned by means of a key which fits upon the end of its axle, winding the cord, *h*, around its drum, and coiling the spring in the drum, I, more closely upon its fixed shaft. Upon the withdrawal of the key the spring would immediately begin to uncoil and ring the bell, were the several parts left free to move, but a simple stop is provided in the form of a bolt, *j*, which passes through the lower edge of the case, and enters between the cams, *f f*, thus preventing the wheel with which they are connected from turning, and holding all the parts in a fixed position. The bolt, *j*, is attached to a spring, *k*, which tends to withdraw it from between the cams, *f f*, but the spring is held in place by a cord, *l*, that is drawn vertically across the middle of the face pate, and attached to a knob at the top.

For each room in the building a slide, M, is provided. Each of these slides has cast upon it an arm, *n*, which passes through a long slot in the face plate into the interior of the case, and is connected rigidly with a rod, *o*. The rods, *o o*, have spiral springs wound around them tending to force the slides, M, toward the middle of the case, but the rods extend outward through the edges of the case, and are held in this extended position by the wires, *p p*, which are conducted to their respective rooms in the manner of ordinary bell wires. When the wire reaches its room, it has attached to its end a stout cord, which is carried once or twice round a belaying pin, and is then connected with a thread or small twine which is made very inflammable. The thread is led around the ceiling, and down by the sides of the doors and windows, and secured by winding its end upon a button provided for the purpose.

Fig. 2.



COOPER'S FIRE ALARM.

If a fire occurs in the room, it burns off the prepared thread, allowing the cord to unwind from its belaying pin, thus releasing the wire, *p*, and permitting the slide, M, to be thrown inward by the spiral spring upon the rod, *o*. As the slide, M, flies inward the knife-blade edge upon its end cuts the string, *l*, releasing the spring, *k*, which withdraws the bolt, *j*, from between the cams, *f f*, thus permitting these cams to revolve and sound the alarm upon the bell, A.

As the slide, M, darts forward, it uncovers a plate on which are words indicating the room in which the fire is burning.

The bell makes an intolerable noise, but if it is desired to have a still louder alarm, provision is made for exploding a bomb with a report louder than that of a musket. The bomb is made of paper filled with gunpowder and overlaid with strong twine, and thus constructed causes no damage by its explosion. It is suspended in the vicinity of the apparatus, and has a fuse leading from it to a match which is inserted in a cylinder provided for it in the face plate. A friction wheel is connected with the spring so as to rub against the match when the spring is released and thus fire the bomb.

The apparatus should be placed in some room which is constantly occupied, and when a fire occurs not only will it be immediately announced, but its location will be indicated; thus preventing any delay in finding the origin of alarm. This apparatus will be found as useful in vessels as in houses, and may be extended to the several buildings of large establishments. It is so simple that any bell hanger may put it up, and the expense, we are assured, will not exceed one dollar per room.

A patent for this invention was granted, through the Scientific American Patent Agency, August 6, 1861, and further information in relation to it may be obtained by addressing the inventor at 10 and 12 Pell street, New York City.

The Scientific American has been published seventeen years. During this long period its columns have sent forth a great abundance of the most valuable information. Thousands of receipts have been given which have been of great benefit to its readers, and would benefit thousands of others if they could be brought to light once more. This we now propose to do, beginning with the first number of the new volume, and continuing them from time to time until much, if not all, of this useful matter is once more reproduced and brought to life. Many a one of our readers has been greatly benefited by some one of these receipts.

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VOL. VI. NO. 25.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, JUNE 21, 1862.

THE TIME IS UP.

The next number of the SCIENTIFIC AMERICAN will close the sixth volume of the new series. As we review the past six months the mind is almost staggered with the stupendous events which have taken place. The achievements of our armies, and the victories of our naval forces have formed subjects of absorbing interest. These great events have doubtless attracted much attention that would otherwise have been devoted to science and mechanics; and yet, considering all these things, it is surprising how much has been done in advancing the useful arts.

Public excitement has energized the public mind, and never before in the same space of time, have our inventors done more to deserve the gratitude of our people. We may justly claim for them many of the successes which have thus far attended the National forces.

At this period last year the affairs of the nation looked dark and gloomy. We then warned our people that "it was no time to be idle while the statesman was puzzled. . . . . The mechanic and inventor are called upon to renewed action, for without their combined power our armies and our republic would be swept from the face of the earth." This call upon our mechanics and inventors was not made in vain. A novel war boat, in the redoubtable *Monitor*, saved a large fleet from destruction at Fortress Monroe, and but for it McClellan's army would not have been menacing Richmond to-day. Two river gunboats of novel construction saved an army from annihilation at Pittsburgh Landing, and new improved guns and other implements of war have given to our forces the advantage in every engagement.

The dark clouds which hung over our country are breaking away, and never in the history of our Republic has more confidence been placed in the permanency of our government. It has exhibited a strength and vigor which augur well for our future peace and its stability. When this conflict is settled we may reasonably expect a period of great manufacturing prosperity, for the productive power of our country is exhaustless. We, therefore, with much hope in the result, take this occasion to call upon our readers to renew their subscriptions for our new volume, which will commence in two weeks from the present date. The amount of subscription is so small, while the information conveyed in the columns of the SCIENTIFIC AMERICAN is so extensive and useful, that we think every inventor, mechanic and manufacturer in our country can, and should, subscribe. It is the only complete source of information respecting new improvements in American machinery and manufactures, and no person can really be intelligent on these subjects who does not consult its pages.

We hope our old friends will introduce the subject to their acquaintances, and also send in their subscriptions at an early date. Ten persons forming a club may have the paper one year for $1 50 each, and it is only one dollar for single subscription for half a year, which embraces one entire volume. Remember our rule to discontinue the subscription when the time runs out, for although we want all the names we can get, we do not wish to thrust the paper upon those who do not want it.

MANUFACTURE OF LARGE GUNS.

The Fort Pitt Works, at the foot of O'Hara-street, Pittsburgh, Pa., have obtained deserved celebrity for the casting of large ordnance. The premises are not very attractive in appearance, they being composed principally of a few common brick structures. Their fame, however, does not rest upon outward embellishments—nor upon their extent, but upon the character of the work executed therein. For several months past this establishment has been turning out weekly from seven to nine large guns and mortars. It was at these works where the great 15-inch Rodman gun (illustrated on page 305, vol. iv., new series SCIENTIFIC AMERICAN,) was completed, and two others of the same size have lately been cast. One of these we saw last week on the lathe, nearly finished, the other had just been lifted from the foundry floor. In the rough, one weighs nearly thirty tuns; when finished, twenty-five tuns. Its extreme length is fifteen feet ten inches; its greatest diameter is four feet. We never obtained a comprehensive and just idea of the size of this great piece of ordnance—the largest in the world worthy of the name of gun—until we saw the huge mass upon the lathe. These two new guns are exactly similar to the one at Fortress Monroe, with the exception of their trunnions, which are placed three inches further back. They were cast hollow and cooled according to Capt. Rodman's invention. We counted nine finished guns and mortars ready to be sent away, and an equal number undergoing the boring and planing operations in the machine shop. Several were cast and ready to be raised from their molds, and several others were undergoing the cooling operations in their molds. The classes of mortars we saw were eight, ten and thirteen inch; the navy guns nine and eleven inches; the army guns ten and fifteen inches. These guns are all pure castings, being made entirely of cast iron. Very great care is exercised in the selection and purification of the metal that is used; and great experience and much skill are necessary in conducting such operations. The castings are truly beautiful; the metal is clear and very close in the grain, resembling steel. A piece is cut from the casting of every gun and submitted to a severe test, then it is labeled, numbered and laid aside for reference. A most excellent quality of pig iron comes to this foundry from Bloomfield, Blair county, Pa.; but good iron is also made in Pittsburgh from Missouri ores. It is, however, in treating the iron when in the furnace that the practical skill of the molder comes into play. The impurities are carefully removed, and only the purest metal allowed to reach the mold.

A new class of large navy guns are about to be cast and finished in this foundry. Hitherto eleven inch guns have been the largest size used in the navy, but a contract has been made for several fifteen inch-Dahlgrens, designed to suit the turrets of such vessels as the *Monitor*; and we had the pleasure of examining the huge patterns from which they are to be cast. The total length of each will be thirteen feet five inches; depth of bore a hundred and thirty inches; diameter of bore fifteen inches; greatest diameter forty-eight inches; diameter at the muzzle in the rough thirty-eight inches. This muzzle, however, is to be turned off to twenty-six and a half inches, and from thence taper up to nothing at the *base line* (a line struck through at the base of the cylindrical bore). The thickness of metal outside of the bore at the base line will be sixteen and a half inches; from this line to the outside of the circle it will be twenty-four inches. A small tapering gas chamber will be formed behind the bore at the base line, a hole one-fifth of an inch will be drilled one inch back from the center, then carried straight to the top forming the vent. These guns when finished will not only be the largest, but the best and most beautiful navy guns in the world. They are not to be cast solid as has been usual with navy guns heretofore, but they will be cast hollow and cooled upon Capt. Rodman's principle. It would be impossible to obtain a good sound, *solid* casting of such a size, hence the necessity for casting hollow. Under Major W. Wade, experiments were made with an eight-inch Columbiad cast solid at Fort Pitt works, and another cast hollow, and cooled inside with water; also with two ten-inch Columbiads, one made solid and the other cast hollow, each pair having been cast from the same metal and furnace. The result showed the hollow cast guns to be much the strongest. The charges of powder used in the trials ranged from ten to fifteen pounds for the eigh-tinch guns, and from eighteen to twenty-four pounds for the ten inch guns, with shot and sabots. The solid cast eight-inch gun burst at the seventy-third fire; the hollow cast gun of the same size was fired one thousand five hundred times without bursting. The solid ten-inch gun burst at the twentieth fire; the hollow cast gun stood two hundred and forty-nine fires before it burst. The mold for a hollow cast-iron gun has a core formed on a cast-iron tube closed at the lower end, and after the metal is run into the mold, the interior is cooled by a stream of cold water admitted into the core by a tube that reaches nearly to the bottom. The cool water descends through this tube to the bottom of the hollow core, then it ascends through the annular space between the two tubes, and is discharged from the core at a point a short distance above the casting, and it flows off in a heated state. It requires the water to flow in a continual stream for several days before a large gun is sufficiently cooled. This system appears to be the most perfect ever devised for casting and cooling large guns. Each of the *Monitor* class of vessels armed with them will be able to hurl shot weighing four hundred and twenty-five pounds, which is nearly three times the weight of the round shot fired from the largest Armstrong gun yet made for the British navy.

BUSINESS IN GENERAL.

Our manufacturers and merchants, very generally, have done a good spring business. The extent of it has exceeded their expectations, and as a consequence, a more buoyant spirit prevails among all classes. The condition of the lumber market is a good index of the condition of the country, because it affords evidence of the number of buildings that are being erected, and when the building art is prosperous it is a sure sign of growth and progress. As Chicago is now the largest lumber market on our continent, it is gratifying to learn that the lumber business of that city has greatly revived. The sales for this summer promise to be good. We learn from the Boston *Commercial Bulletin*, that most of the manufactories in Massachusetts are running nearly full time, that Laurence and Lowell are busy, and that in several places new factories have been put up and several old ones enlarged. Orders are now beginning to come in from some of the Southern cities, which have been made submissive to legal authority. Six tuns of tacks were lately sent to New Orleans from Taunton, Mass., and a large order for plated ware has been received at Hartford, Conn., from the same place, this being the first since March 1861, when the secession frenzy seized the people of Louisiana. The quantity of goods now being manufactured is not equal to that of former prosperous times but for all this it is very large, considering the circumstances of the country. The quantity of cotton on hand is very small, and the cotton market is stagnant because prices rule high, being 31 and 31½ cents per lb. for middlings. It is expected that Charleston, S. C., and other Southern cotton ports will soon fall into possession of the Union forces, and that a large supply of cotton will be obtained at early date.

THE LONDON EXHIBITION MANAGEMENT.

We judge from the remarks of our foreign cotemporaries, that the London Exhibition this year, will be a financial failure, however successful it may be as a display of manufactures, mechanism and art. Its management is denounced as being short sighted and mean. The absence of Prince Albert—who was the ruling genius of the Exhibition of 1851, is now felt. The season tickets are too high in price and the Commissioners have made a rule charging each exhibitor the fee of a season ticket. Foreign and British correspondents of the press are also charged for season tickets, and letters are now appearing in the French and German papers ridiculing the building and the stiff and thick-headed Commissioners who do not seem to have sufficient gumption to conduct the Exhibition upon liberal principles. Mr. Train in a late speech upon the subject in London, stated in substance that the show appeared to be conducted espe-

inlly for the aristocracy, and that the people were shut out of Hyde Park and not recognized.

INCRUSTATION OF STEAM BOILERS.

A positively harmless and cheap remedy for this universal evil must prove of great interest to all using or owning boilers. The loss of fuel alone, to say nothing of risk of explosions from choked up feed pipes, and burning out of the boiler in heating through this non-conducting crust, must be amply repaid by any non-injurious antidote. So many remedies have been found inefficient or injurious, we had concluded to recommend nothing again; but our attention has been especially called to the "Anti-Incrustation Powder," made by H. N. Winans, of this city, that we have concluded to call public attention to it through our columns.

If any reliance can be placed in the testimony of practical engineers and owners of boilers, who have for a long time used this article, then it is certainly a thing of much value, and well worth the attention of all who use steam power. We have examined a multitude of testimonials in which its merits are emphatically set forth. They all agree that the ingredients used are not injurious to the iron of the boiler, that they neutralize the action of acids contained in the water, arrest oxidization, loosen scale where it has been formed, and effectually prevent its formation at all times, keeping the boiler smooth and clean.

We recently read a letter from an engineer of the steamboat *Antelope*, running on the Mississippi, in the vicinity of St. Paul, Minn., in which he states, that since using Winans's Incrustation Powder they were enabled to make 20 lbs. more steam, in the same boiler, with the same fuel. The article is in use by hundreds of respectable parties, and in many cases practical results similar to the above are alleged to have been obtained. The inventor's office is at No. 11 Wall street, New York city, where he will be happy to see any who wish to inform themselves further upon the subject.

NEW ENTERPRISE—STEAM WAGON FOR THE WESTERN PRAIRIES.

On the 7th inst. Gen. J. R. Brown, of Minnesota, forwarded by the New Jersey railroad, for the West, a peculiar steam wagon. It was built by Mr. John A. Reed, No. 63 Liberty street, this city, and is intended to be used in the transportation of freight from Omaha to Denver city, in Kansas. It is propelled by four engines of ten-horse power each. The driving wheels are ten feet in diameter, and they have a tread of eighteen inches in width. The steering wheels are six feet in diameter and twelve inches broad in the face.

Ample provision is made for carrying wood and water sufficient to run the engines four hours. From the tests that have been made, the wagon has been proved capable of hauling eight tuns of freight at the rate of four miles per hour, or of being propelled at the rate of six miles per hour with one or two tuns behind it. In an experiment in ascending Bergen Hill, N. J. (which is equal to six hundred feet per mile), it moved steadily at the rate of about four miles per hour without any perceptible diminution of steam. An engineer, fireman and steersman are required in operating the machine, and the consumption of fuel will be equal to one cord of wood in eight hours. The owner and the builder of the wagon, as well as the engineers and others who have witnessed the trials of its speed and the adaptation of the machinery, have the fullest confidence in its success. They believe it capable of hauling ten tuns of freight at the rate of eighty to one hundred miles in the twenty-four hours, over a common road.

This enterprise is one of great importance, and we shall watch its development with deep interest. If steam can be successfully used for the transportation of freight and passengers over our Western prairies, it will have an important bearing upon the interests east of the Sierra Nevada range, and will materially promote the settlement of our Western lands.

We heartily wish—it is quite natural that we should—that every one of our readers would make up his mind at once to get at least one new subscriber to the Scientific American. We should be delighted with such a demonstration of loyalty to our journal.

Cultivating Plants when the Dew is On.

The following interesting and practical information is from a correspondent of the *Country Gentleman*:—

Fifteen years ago, I noticed a plot of cabbages, the large firm heads of which I could not account for from anything apparent in the soil. On asking the owner how he made from such a soil so fine and uniform a crop, I found his only secret was that "he hoed them while the dew was on." He thought that in this way he *watered* them, but of course the good resulted more from the ammonia than the moisture of the dew.

I adopted the practice the following year, and with the result was so well satisfied, that I have since continued and recommended it to others. There will be a very great difference in the growth of two plots of cabbages, treated in other respects alike, one of which shall be hoed at sunrise and the other at midday; the growth of the former will surprisingly exceed that of the latter.

A story in point sometime since went the rounds of the agricultural press, of which the substance follows: A small plot of ground was divided equally between the hired lad of a farmer and his son, the proceeds of its culture to be their own. They planted it with corn, and a bet was made by them as to which should make the best crop. At harvest the son came out some quarts behind. He could not understand the reason, as he had hoed his twice a week until laid by, while he had not seen the hired lad cultivate his plot at all, and yet he had gained the wager. It turned out the winner's crop had been hoed quite as frequently, but before his rival was up in the morning. Providence, it seems, follows the hoe of the early riser with a special and increased reward.

But there are exceptions. Cultivating while the dew is on, manifestly benefits such gross feeders as cabbage and corn, but there are plants very impatient of being disturbed while wet. The common garden snap and running beans are examples; and if worked while wet, even with dew, the pores of the leaves seem to become stopped, and the whole plant is apt to rust and become greatly injured. Whether the Lima beans and other legumas are as impatient of being hoed in the dew, I have not ascertained. Experiments should, however, be tried the coming season on all hoed crops.

Photographic Engraving.

A new method of photographic engraving by M. Fontaine, of Marseilles, France, is described as follows in the *Photographic News*:—

Having a photographic negative of the object which it is desired to engrave upon copper, I expose it in a pressure frame to the light in contact with a plate of that metal, covered with a solution composed of pure gelatine, bichromate of potassa, and fish glue. After exposure to the light, I immerse the plate in a dish containing lukewarm water, the bichromate of the soluble portion of the gelatined plate being dissolved, I obtain the design from the negative *en creux* (intaglio); then I pour upon it some pyrogallic acid to harden the gelatine and fix it, so that the minute details should not disappear upon its drying. When dried, I pour upon the plate a solution of pure gutta-percha in sulphide of carbon, and afterward I take a piece of gutta percha of the same size as the plate, and warm it on one side. I then put it in contact with the side of the plate, which I had covered with the solution of gutta percha, and put in a press. Next removing the whole from the press, I remove the gutta percha from the gelatined plate, which is perfectly united with the purified gutta percha, and I have then obtained in relief in great purity the design of the negative which I desire to engrave. After black-leading it, I place it in an electrotype bath, and thus obtain an engraved plate.

Bunsby Again—A Dark Prospect.—The London *Post*, Ministerial organ, gives it as its deliberate opinion, that if the Federal army beats the Confederate army the latter will be vanquished, but if the Confederate army beats the Federal army the South will gain their independence. It seems to us just as though knowledge would die out with the demise of this Jack Bunsby the second. Verily, darkness is again brooding over the whole earth.

Waste Products of Gas Works.

In a late lecture on the above subject by Dr. Lyon Playfair, before the Royal Society, London, he endeavored to illustrate the effect of enriching pure hydrogen gas by passing it through naphtha, when the glass vessel in which the fluid was contained exploded as he applied the light to it, and fragments of glass were scattered in all directions, and dense brown fumes filled the lecture-room, and drove many of the ladies away. He exhibited a large and beautiful mass of paraffine and a bundle of paraffine candles that had been made from coal tar, and contrasted the present state of the manufacture and the use of that article with its condition in 1851, for in the Exhibition of that year, a single paraffine candle only was exhibited as a great curiosity, which had been produced from peat; whilst in the Exhibition now open, there are abundant specimens of the paraffine wax and candles made from coal tar, the production of that article having become an important branch of manufacture. He stated that 4,000 tuns of the muriate, 5,000 tuns of the sulphate, and 2,000 tuns of the carbonate of ammonia are annually produced from gas liquor; and he no doubt surprised, and somewhat disgusted the lady portion of his audience by informing them that their smelling bottles are filled from the refuse of gas works, and the sweeping of streets. He exhibited the process of extracting oil and naphtha from coal, and described the chemical changes that take place in the formation of aniline, roseine, and the other hydrocarbon compounds that now form dyes of all colors. Specimens of all the products were exhibited, and of silks and woolens that had been dyed by them. To illustrate more forcibly the quantities of such products derived from coal, a mass of coal weighing 100 lbs. was placed near the lecture table; and near to it were placed the various products obtained from a mass of that size, and the quantity of wool which had been dyed by the products of the distillation of a similar mass. The chemical processes by which coal becomes converted into beautiful colors, may, he said, also be applied to extract from the mineral the smell and flavor of almonds, with which confectionery is now flavored, as a substitute for the far more dangerous dilutions of prussic acid.

Gen. Beauregard and the Scientific American.

We find, on looking over our list of subscribers in New Orleans, that Gen. Beauregard was one of the number. We owe him something on this account, and we hereby notify the General that if he will now take the oath of allegiance, and heartily repent of his past sins and folly, we will once more send him the Scientific American, a new volume of which begins July 5th; terms $2 a year, $1 for six months. We are surprised that Beauregard could have conducted himself as he has done. The only explanation we can possibly give on the point is that he had been a reader of our paper for only a short time, and was early cut off from its constant perusal by the blockade. Gen. Beauregard's wife, we are happy to know, is under the protection of Gen. Butler.

Another Steamer for China.

The new and elegant steamer *Fire Cracker*, just built under the direction of its commander, Capt. Henry W. Johnson, sailed from this port for Shanghae, China, on the 7th inst. Among the passengers were Mrs. H. W. Johnson and Mrs. Anson Burlingame; the latter goes out to meet her husband, who is the American Minister in China. The building of steamers to run on Chinese rivers is augmenting to a very large business in this country. Capt. Johnson took out the steamer *Fire Dart* about eighteen months ago, which has been very successfully employed since her arrival there.

Every subscriber of the Scientific American ought to be an agent for the increase of its circulation. Whoever reads the paper can aid in this matter very materially by recommending it to his neighbors. In the absence of agents we appeal to our friends to lend us a hand. Let us have a "subscription bee," such as we remember used to take place in our early days, when all turned out with oxen horses, plows and shovels to do up some good work with dispatch.

The canals of this State are in navigable order their entire length, according to a report at the Engineer's office since the great freshet which caused so much destruction in Pennsylvania and elsewhere.

THE LONDON EXHIBITION.

It is our intention to give a series of articles—the information being collected and derived from reliable sources—on the machinery and articles in the Great Exhibition. We begin with

MARINE ENGINES.

With respect to the comparative character of the marine engines in the Exhibition, the London *Engineer* says :—"The triumph of the screw over the paddle is complete." All the engines are direct acting and the stroke in the largest does not exceed four feet. No new style of engine has been brought forward, but the mechanical skill exhibited in the construction of all receives high praise. The trunk engine which is commonly used for the war ships of the British Navy, was first designed by James Watt, and represented in the specifications of his patent of 1784, for a steam hammer. Maudslay Sons & Field, exhibit 800-horse power screw engines for the *Valient*, a new iron plated frigate. These are a pair of horizontal double piston rod engines with 82-inch cylinders, stroke 4 feet. The cylinders are steam jacketed, and the covers are also double to admit steam, so as to prevent inside condensation. The air pumps are worked by long rods directly from the pistons. There are two slide valves working simultaneously for each cylinder. Each is double ported, and steam is taken at once through four openings at each end of the cylinder. The steam pressure is nearly taken off the back of the valve by a counteracting balance pressure adopted for all the engines of this company. Another set of marine engines on exhibition are a pair of 400 collective horse power, by Messrs. Humphys & Tennant. They have horizontal cylinders, 64¼ inches in diameter and 32-inch stroke. The valves are worked by a link motion, the link being a curved bar. The valves are double ported and placed on the sides of the cylinders. A pair of such engines is furnished on shipboard with a fire bar surface of 280 feet and a heating surface of 7,600 feet in the boilers and they carry 25 lb. pressure. Although rated at 400-horse power, they work up to 1,858-horse power.

Messrs. John Penn & Son, exhibit a pair of 600-horse power trunk engines made for the Spanish government, also one cylinder of the engines for the great new iron plated frigate, the *Achilles*. This cylinder is 112 inches in diameter, for stroke of 4 feet. It weig hs 18 tuns.

Messrs. Todd & Macgregor, of Glasgow, exhibit a pair of 60-horse power screw engines, with inverted cylinders 30 inches in diameter and 22-inch stroke. These engines are the only pair provided with surface condensers (Sewell's). They have a link motion as a reversing gear and an expansion gear besides. They are described by the London *Engineer* as being models of compactness and neatness of design.

In the French Department are a pair of 400-horse power engines from *La Compagnie des Forges et Chantiers de la Mediterranée*. Their general arrangement is like those of Maudslay Sons & Field, but they are peculiar in not having the eccentrics for working the valve rods, on the main shaft as is common on English engines. The eccentrics are on another shaft placed above and geared to the crank shaft—apparently a superfluous arrangement. The slide valves are fixed on the top of the cylinders, the latter are not steam jacketed. English papers state that the screw for the French engines has edges as sharp as a lady's fan while the British screws are rounded off at the corners. There can be no question of the fact that by rounding the edges of a screw propeller its useful effect is increased so much as to give an additional speed of about from 11 to 25 per cent to the vessel. One thing very striking and dissimilar between screw and paddle-wheel engines is the very short stroke of the former compared with that of the latter. For example, the new paddle-wheel steamer *Scotia*, which lately visited New York, has cylinders of 100 inches in diameter and 12-foot stroke, while the *Achilles*, mentioned above, has cylinders 112 inches in diameter and only 4-foot stroke. Engines to drive propellers by direct action make from 40 to 80 revolutions per minute according to the pitch of the screw. The short stroke is necessary to get up the proper speed on the screw. It is also contended by some engineers that there is less friction involved in a short than a long stroke, but this is mere fancy.

NOTES ON FOREIGN INVENTIONS AND DISCOVERIES.

A Kite Life Buoy.—A patent has been obtained by Lieut. G. Nayres, R. N., for a kite to be used for saving life in cases of shipwreck. The kite is made similar to those used by boys, but its central stem has a hinge, and the stretcher bar at the top is jointed to the vertical stem. It is covered with canvas, and by means of the jointed stretcher, it is adjusted so as to present more or less surface as may be required according to the strength of the wind. Two lines are used for the kite, one being in the position of the common string used in flying, but with a thimble, near the kite, through which a second cord is run, passing toward the lower part of the central stem, thence through a swivel, and extending to the hand. This kite is flown in the usual manner by the first line, and when it has reached a point directly above where it is to be lowered, the first line is slackened and the second held firm, when the kite is immediately brought down, and it may thus be used to draw a man ashore from a wreck, and when made hollow, it can be inflated and used as a life buoy.

Rolled Cast-Steel Rifle Barrel.—L. Cristoph and G. P. Harding, of Paris, and W. Hawksworth, of Linlithgow, Scotland, have obtained a joint patent for making steel tubes for rifle barrels without welding, by drawing and rolling. A peculiar form of mandrel, having two or more swellings, is used in drawing the tubes. The one which comes into action first is the smallest, and the size of each gradually increases. A thick draw plate with a conical hole is used, and the aperture corresponds with the graduated enlargements of the mandrel. In making a steel conical tube, such as may be used for a musket barrel, the skelp of steel is first cast hollow, or cast solid and bored out, then drawn and rolled over the mandrel to give it a true smooth cyclindrical bore, and a slightly tapering outside form. The tube is lastly placed in a matrix, and a mandrel drawn through it having projections on it to cut rifle grooves, and thus obviate the tedious and expensive mode of cutting grooves with a rifling lathe.

Water-Proof Walls.—W. Smith, of London, has obtained a patent for a preparation, which he states, renders the walls of brick and stone houses completely water proof when applied to them. He takes flint or other such silicious substances, and reduces it to fine powder; then he adds to this some powdered alum, and mixes them thoroughly with water, reducing them to the consistency of common oil paint. The composition is now applied with a brush to the surface of the wall, and when it becomes dry it resists water. This composition while being applied, requires to be continually stirred in the vessel which contains it. It is cheap, and when applied to wooden buildings, it renders them almost fire proof.

Gunpowder for Blasting.—The gases which result from the explosion of gunpowder in mines are very offensive and deleterious, and is it therefore very difficult for miners to work for some period of time after a blast has taken place in a coal mine. To obtain a powder better adapted for mines, not as regards its expansive force, but to render it less injurious to the miner, respecting the pollution of the air which he inhales, I. Lobb, of London, adds a quantity of fresh slacked lime and a little dry saw dust, and uses about one half the quantity of the sulphur that is in common gunpowder. The dry lime prevents the powder from becoming deliquiscent in such damp situations as mines, and at the same time, it tends to absorb some of the fetid gas.

Preserving Articles of Food.—A patent has been obtained by I. McCall and G. B. Sloper, of London, for preserving articles of food, the principle of the invention consisting of introducing into tin cans containing the food a substance for which oxygen has a greater affinity than for the meat or other article of food under preservation, and which at the same time shall be in no way detrimental to it. The patentees have found in practice that sulphite of soda is the best agent for their purpose. They prefer to incase or cover the sulphite of soda or other suitable material in composition as aforesaid, in gelatine or other suitable protecting coat, to prevent its coming into action before the coat has been dissolved by the heat to which the tin and contents are first subjected, and the time of its solution they vary according to circumstances. About the time they have calculated for its solution, they hermetically seal the tin, and then for a short period apply a higher degree of heat, when the oxygen remaining in the tin and in the meat or other food will combine with the sulphite of soda.

RECENT AMERICAN INVENTIONS.

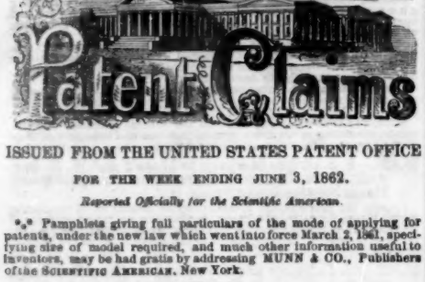
The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list on another page :—

Spring Spur.—The object of this invention is to facilitate the putting on and taking off spurs and to arrange the fastening so that the spur will fit boots of different sizes, and also be held firm and thus be prevented from dropping off, and at the same time, should the rider be thrown, and the spur catch on the stirrup, it will be detached from the boot, preventing him being dragged on the ground. The invention consists in the application to a spur of two curved spring arms, bent in such a manner that when they are slipped or sprung over the instep of a boot they will draw the spur up tight against the heel and retain it firmly in its place. It consists further in combining with said curved spring arms a strap or wire which passes under the foot, which is provided with two loops, one on each end, to which the pants can be fastened. A. S. Hudson, M. D., of Sterling, Ill., is the patentee.

Piano Orchestra.—This invention consists in the application of musical instruments played by percussion, such as drums, cymbals, tam-tams, triangles, &c., to harmoniums, pianofortes, organs or other instruments played by keys, in such a manner as to allow the performer to bring the said instruments into play by making use of his hand or forearm during the execution of a piece of music, without causing an interruption of the harmonies or passages. Also in novel mechanism for playing upon the small or rolling drum, in order that when so applied and played by keys it may realize nearly all the effects executed by a skillful drummer with his drumsticks. Also in a mechanism applicable to harmoniums, organs and other wind instruments played in a similar manner, by means of which the keys may be stopped with their valves in an open condition, in order to permit the player to act freely on the percussion instruments during the sustained accords or tunes, whenever it is desired to produce a particular effect with the latter instruments. Also in a set of metallic funnels or trumpets adapted to the accoustical holes of harmoniums, &c., through which the sound, by applying the tremolo-vale, receives the character of a trumpet. And further, in uniting the said percussion instruments in one which, being played upon by a single artist in the same manner as any other instrument played by keys, may be employed in an orchestra or for accompaniment in general. We have seen in one of the French journals a very flattering account of this instrument as performed by Mr. Schalkenbach, the inventor, of Triers, Prussia. The assignee of the United States patent is E. Justh, of San Francisco, Cal.

Chimneys for Coal-oil Lamps.—This invention consists in combining a glass chimney and a glass cone in one piece so that they will be permanently attached, and having the chimney perforated near its base to admit air to the flame above the cone. The invention is designed to be applied to coal-oil lamps and has for its object economy in the construction of the fixtures, greater facility in exposing the wick tube for trimming, durability as regards the fracturing of the chimney and cone either by heat, blows or casually dropping them, and also insuring a perfect combustion with a low or small flame. The inventor is William Howard, of Flushing, N. Y.

To keep Bugs from Vines.—A correspondent of the *American Agriculturist* gives this remedy for protecting melons and other vines from bugs :—Take common cotton batting, separate it into very thin layers, and spread over the plants as soon as they appear, putting a little dirt on each corner to prevent the wind from blowing it off. He has tried it for several years with success. The plants may attain considerable size before removing the cotton. The cotton does not interfere with light or moisture.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JUNE 3, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

35,428.—J. Q. Adams, of Highspire, Pa., for Improvement in Horse Rakes :

I claim the combination of the spring plates, M M, with the rake teeth, I I, when turning on a separate shaft or axis from said rake teeth, for the double purpose of holding the rake teeth down more firmly, and of raising them from the ground when required, substantially as specified.

35,429.—J. S. Atterbury, James Reddick and T. B. Atterbury, of Pittsburgh, Pa., for Improvement in the manufacture of Hollow Glass Ware in Bas-relief :

We claim a new manufacture consisting of glass ware with open illuminated relief work on its surface, substantially as described.

35,430.—J. S. Atterbury, James Reddick and T. B. Atterbury, of Pittsburgh, Pa., for Improvement in the manufacture of Hollow Glass Ware :

We claim a new manufacture of glass ware, which, while it shall have smooth surfaces both without and within, and while its internal structure is entirely solid without any open spaces or interstices left therein, shall present the appearance of cut or pressed glass, substantially as and for the purpose above described.

35,431.—George Bailey, of Buffalo, N. Y., for Improved Baggage Check :

I claim the described method of checking baggage, that is to say, by attaching to the article a ticket holder, and inserting therein a card which is the counterpart of the one given to the traveler, substantially in the manner and for the purpose set forth.

35,432.—C. F. Barager, of Candor, N. Y., for Improved Reversible Plow :

I claim the combination of the movable or swinging section of mold board, I, spindle, J, gear wheels, K c, and pivoted beam, E, with the fixed sections of mold board, H H′, when arranged to operate in the manner and for the purpose set forth.

[This invention consists in a peculiar manner of attaching a swinging section of mold board on the side of a plow having two shares, and connecting it with the beam in such a manner that it may be turned to correspond with either of the plow shares, and thus adapt the implements to use as a right or left-hand plow as may be desired, by simply turning the beam in one or the other direction.]

35,433.—W. B. Bement, of Philadelphia, Pa., for Improvement in Stands for Machines :

I claim the main supporting structure of machines, having a cabinet or safe tool receptacle formed therein, when cast in one entire piece, essentially in the manner and for the purposes set forth and described.

35,434.—W. B. Broadwell, of Springfield, Ill., for Improvement in Corn Plows :

I claim in combination with the bar, G, and clamps, H H, the fender or guard, I, applied to the beams, A A, and bar, G, as and for the purpose specified.

[The object of this invention is to obtain a corn plow which may be readily adapted for use, either as a single or two-horse plow. The invention consists in constructing the implement of two distinct parts, each being provided with two plows, and connected in such a manner that they may be readily detached when one part only is required ; the means employed for connecting the two parts of the plow, admitting of being adjusted so as not to interfere with the plants or break down the same as the machine is drawn along. The invention also consists in using in connection with the implement thus constructed, a fender or guard so constructed and arranged as to protect the plants from clods or earth which might otherwise be thrown upon them by the action of the plow.]

35,435.—S. B. Conover, of New York City, for Improvement in Potato Diggers :

I claim, first, The combined rotary screen, conveyer and weed separator, formed of two conical parts, J J, connected to a common axis or shaft, I, and provided with openings, a a, substantially as and for the purpose set forth.

Second, The scoop or share, M, and rotary screen, conveyer, and weed separator, having a shake motion as described in combination with the lifting receivers, P Q, all arranged for joint operation as and for the purpose specified.

[This invention relates to an improved machine for digging potatoes; and of that class in which a rotary screen is employed to separate the potatoes from the earth, and deposit the former in suitable receptacles.]

35,436.—J. W. Coombs, of Mount Vernon, N. Y., for Improvement in Coal Scuttles :

I claim, first, The combination of the scuttle, A, hinged ash box, E, shaking sieve, D, and handle, j, all constructed, arranged and operating in the manner and for the purposes set forth.

Second, The combination with the sieve, D, and scuttle, A, of the ring, h, as and for the purpose specified.

Third, The arrangement of the jointed removable lid, C, in combination with the scuttle, A, as and for the purpose described.

Fourth, The combination with the hinged lid, C, and bale, B, of spring cars, f, each provided with two sockets, g g, as and for the purposes specified.

[This invention consists in the arrangement of a movable sieve in the interior of a coal scuttle, in combination with an ash or dirt box, hinged to the bottom of said scuttle in such a manner, that by the action of said sieve the good coal can be separated from dirt or ashes that may be mixed with it, and that the moisture which generally adheres to coal, and which causes coal scuttles to rust and wear out in a short time, is permitted to pass through said sieve down into the ash-box without injurious influence on the sides of the scuttle.]

35,437.—L. C. Crowell, of West Dennis, Mass., for Improvement in Aerial Machines :

I claim the arrangement of the hinged wings, A, car, B, and pyramidal winged steering apparatus or rudder E, in combination with the adjustable hinged propeller, C, constructed and operating, substantially in the manner and for the purpose shown and described.

[This invention consists in the arrangement of two or more flat, sharp pointed hinged wings, capable of being turned up into a horizontal position or down into a vertical position, and of one or more rotary hinged propellers, the shafts of which can be brought in a horizontal or in a vertical position, or to any desired inclination, in combination with a pyramidal winged steering apparatus or rudder, and with a suitable car in such a manner, that from said car the motion of the whole machine can be controlled by the position given to the propeller, to the wings, and to the rudder.]

35,438.—B. F. Field, of Sheboygan Falls, Wis., for Improvement in Seeding Machines :

I claim, first, The combination of the grain measuring slide, G, screw, f, thumb nut, g, index, i, and dial, N, with the bottom, a, and shut-off slide, I, when arranged in the manner and for the purpose set forth.

Second, The combination of the compartments, E F, false bottom, a, slides, G I, tubes, J J, and chute, o, when arranged as described.

Third, The agitators, consisting of elliptically-formed disks of metal, p, secured in an oblique position on a horizontal shaft, q, arranged to operate in the manner and for the purpose set forth.

[This invention consists in a simple device for varying the size of the seed apertures in the hopper, and indicating on a dial the quantity of grain sown per acre ; also an arrangement of grass seed hopper inside the hopper ; also in a peculiarly-formed agitator, consisting of ellipically-formed disks of sheet metal, secured in an oblique position on a horizontal shaft.]

35,439.—D. R. Fraser, of Chicago, Ill., for Improvement in Piston Packing :

First, I claim employing through means, substantially as described, the combination of the expanding action and compressing action of steam at one and the same time upon the ring or rings, I, of a piston, substantially as and for the purposes described.

Second, The arrangement of the valves, their seats, their springs and their chambers, with relation to the piston head and follower and the packing rings, for the purposes described.

Third, The construction of the ring, C, substantially as and for the purpose described.

Fourth, I claim the arrangement and combination of the packing rings, C H I, the whole constructed in the manner and for the purpose described.

Fifth, I claim the combination and arrangement of the wedge, E, or its equivalent with the centering bolt or screw, D, of the piston, substantially in the manner and for the purposes described.

Sixth, The interposition of self-adjusting wedges, B, substantially in the manner and for the purposes described.

Seventh, Adjusting the packing by means of wedges, B, applied between it and the arms of the piston head, A, whether the wedges be operated automatically or otherwise, for the purpose set forth.

Eighth, The spaces, p, substantially as and for the purposes set forth.

35,440.—C. H. Frost, of Peekskill, N. Y., for Improvement in Heaters :

I claim, first, The extension of the corrugations of the fire pot from the top to the bottom, and opening into the ashpit, substantially as set forth.

Second, The combination of a grate and fire pot, in such a manner as to leave the spaces formed by the corrugations of the fire pot and rim of the grate open into the ashpit, and free for the passage of air, substantially as set forth.

35,441.—H. N. Fryatt, of Belleville, N. J., for Improved Centrifugal Machine for Filtering Liquids :

I claim, constructing the centrifugal machine for filtering purposes, with an annular filtering chamber surrounding a central reception chamber, the said filtering chamber having a closed top and bottom, and its sides being formed of an outer and inner pervious cylinder, with the inside filled with pulverized charcoal or its equivalent, substantially as and for the purpose set forth.

I also claim in combination with the central reception chamber, and the annular filtering chamber, the cap extending inward over the reception chamber, and the inner cylinder to form a chamber in which the liquid accumulates before pressing through the filtering chamber, substantially as and for the purpose set forth.

35,442.—I. A. Heald, of Washington City, D. C., for Improvement in Machines for Making Cigars :

I claim, first, A series of grooved and smooth rollers, F F′ G G′, constructed and operating substantially as and for the purpose set forth and described.

Second, The combination of cylinders, I I′, and cylindrical castings, J J′, constructed and operating substantially as and for the purpose set forth.

Third, The combination of rollers, K K′, with the cylinder, I′, operating substantially as described and for the purpose set forth.

Fourth, Apron, L, and friction roller, t, in combination with rollers, K K′, constructed and operating substantially as set forth.

Fifth, Finger, p, or its equivalent, when operated substantially as described and for the purpose set forth.

Sixth, The revolving sliding shaft, N, constructed and operating substantially as and for the purpose specified.

35,443.—Edward Heaton, of New Haven, Conn., for Improvement in Ordnance :

I claim the construction of the screw breech with the ball seat, d d, and a charge chamber, D, which is contracted at i i, toward the seat, as and for the purpose shown and described.

[This invention is more especially intended for ordnance. Its principal object is to enable accurate firing to be performed with iron projectiles without the use of packing of soft metal or other material, and to obviate in a great degree the escape of gases around the sides of such projectiles.]

35,444.—Jacob Holben, of Allentown, Pa., for Improvement in Operating Grinding Mills :

I claim the method specified of cleaning millstones by the use of sugar or other similar substance in cleaning the stones.

35,445.—Samuel Holdsworth, of Durham, England, for Improvement in Looms. Patented in England, May 17, 1860 :

I claim, first, The combination of the saddle, C, the catch, E, the traverse bar, F, and instrument, G, the switch bar, J, and the dofter plate, K, the whole applied and operating substantially as set forth to insert and withdraw the terry or pile wires in a loom.

Second, The construction of the lever, B′, through which the mechanism for inserting and withdrawing the pile or terry wires is actuated, with a curved slot, B*, substantially as and for the purpose set forth.

Third, The combination of the pusher, H, and the instrument, N, constituting a means of transferring the wires from the position to which they are withdrawn from the fabric to that from which they are reinserted, substantially as described.

Fourth, The employment of the supporting post, N2, of the instrument, as a means of tightening the weft, substantially as specified.

Fifth, The combination for oiling or lubricating the terry or pile wires of a vessel, u3, a grooved or channeled bar, u, and a sponge, u4, the whole applied and operating substantially as set forth.

Sixth, The combination of the picking nipples, v′ v2, attached to the wheel, P, the lever, P′ P3, the shaft, P5, the sectors, P8 P9, and the straps, P6 P7, connecting the levers with the pickers when arranged and operating as specified.

Seventh, The combination of parts, for operating the tappets, consisting of the separate shaft, S, the internal toothed wheel, Q, and the pinion, Q′, the whole applied and operating substantially as specified.

[This seems to be an important invention. Its object can be understood by the claim, but it would be impossible to explain the mechanism intelligibly without drawings.]

35,446.—P. N. Horseley, of Jersey City, N. J., for Improvment in Ventilators for Hats :

I claim the air arrangement of the sliding ring, C, in combination with a hat or head covering, B, and connected to the same by rods, c, and spring sockets, c, or by other equivalent means, substantially as and for the purpose shown and described.

[This invention consists in the arrangement in the interior of a hat or other head covering of a movable frame, one part of which is attached to the hat or head covering, while its other part is made to slide in and out in such a manner that whenever the wearer desires, the hat or head covering can be raised from the head, and returned in such a position, that the air has free access to the interior of the hat or other head covering all around the head, and that by this action an agreeable and cooling ventilation is effected.]

35,447.—William Howard, of Flushing, N. Y., for Improvement in Coal-Oil Lamp Chimney :

I claim, as an improved article of manufacture, a chimney and cone made with the bases of the two parts joined together ; the cone being placed within the chimney, and the latter being provided with apertures, b, to admit air between the cone and chimney, all as shown and described.

35,448.—A. S. Hudson, of Sterling, Ill., for Improved Spring Spur :

I claim, first, The employment or use of the curved spring arms, B, in combination with the spur, A, substantially in the manner and for the purpose shown and set forth.

Second, The arrangement of the looped wire, C, passing under the foot in combination with the curved spring arms, B, applied and operating as and for the purpose specified.

35,449.—T. S. Hudson, of East Cambridge, Mass., for Improvement in Inkstands :

I claim, an ink stand as constructed with the separate annulus, d, combined with the perforated cap, b, and cover, g, in manner, and so as to operate therewith, substantially as described.

35,450.—Jacob Jahraus and J. G. Bickel, of Buffalo, N. Y., for Improvement in Faucets :

First, We claim the combination of a force pump or syringe, with the faucet, when constructed and operating substantially as described.

Second, We claim the formation of the holes, o p, in the key of a faucet with the tubes, n q, for the purpose of producing a self-acting vent, substantially as described.

35,451.—W. H. Johnson, of Springfield, Mass., for Improved Marine Propeller :

I claim, a propeller for vessels, consisting of a rigid vibrating arm, H, to which is pivoted an elastic blade, M, substantially as specified.

35,452.—Frederic Kettler, of Milwaukie, Wis., for Improvement in Rotary Pumps :

I claim, first, The combination of cog rollers, D, with piston, C, and plate, B, as shown and described.

Second, The abutments, E, and plates, E′, and pistons, C, as combined and arranged with the whole apparatus.

Third, The elevation, F′, in combination with the spring, F, arranged and combined with the apparatus as described.

Fourth, The volute spring, G, arranged in the manner and for the purpose specified, in combination with the apparatus, forming a packing around the axle, A.

Fifth, Valve, m, in combination with the apparatus, in the manner and for the purpose set forth.

35,453.—Arthur Kinsella, of Cascades, Washington Territory, for Improvement in Aerial Machines :

I claim, the arrangement of the generator, D, and condenser, E, connecting with the cylinder, C, by means of pipes, d d′ g g′, and stop cocks, e e′ h h′, operated by crank shafts, I I, as described, in combination with the fan wheels, F F′, tubes, G G′, and with the rocket-shaped balloon, A, the whole being constructed and operating in the manner and for the purpose specified.

[This invention consists in the employment or use of a gas generator and condenser, connected to a suitable cylinder by means of pipe provided with stopcocks that are alternately opened and closed by the motion of the crankshaft, in combination with fanwheels and discharg pipes passing out at the stern of the rocket-shaped balloon, and with a steering gear in such a manner, that by the action of the fanwheel the air is forcibly driven out at the stern of the balloon, and the latter is propelled in the same manner as a rocket, and at the same time the course of the balloon can be governed at pleasure.]

35,454.—William Koss, of McGregor, Iowa, for Improved Trace Fastening.

I claim the adjustable trace fastening, consisting of the double spring plate, B, hinged at, D, the rod, S, and springs, F, and P, all constructed and arranged as described and set forth.

35,455.—T. S. Lambert, of Peekskill, N. Y., for Improvement in Boilers and Tea Kettles :

I claim, first, The construction and combination of a lug and bail, in such a manner by grooves or pins that the weight of the boiler when inclined in pouring will fasten the two together, substantially as set forth.

Second, The combination of the arm, A, figure 3, of the cover with the lug and bail, in the manner substantially as set forth.

35,456.—J. B. Leverich, of New York City, for Improvement in Cover for Gun Locks :

I claim the employment or use of a cover, A, of india-rubber, cloth, or other suitable material impervious to water, having in its ends elastic bands, a, or their equivalent, substantially as described for the purpose of protecting the lock of fire-arms.

[This invention consists in the employment of a bag of some water-tight material, and provided with elastic bands at its ends in such a manner that the same can be stretched over the lock of a gun or other firearm, and that when thus stretched over the lock, the bands embrace closely the stock and the barrel of the gun on either side of the lock, thus forming a sure protection to the lock against water or other impurities, and when the firearm is to be used, said bag can easily be turned back, so as to expose the lock and give free access to the same.]

35,457.—E. B. Manning, of Cromwell, Conn., for Improvement in Tea and Coffee Pots :

I claim an improvement in the construction of Britannia pots, by making the lower body and bottom of such vessels of iron or a metal capable of bearing much greater heat than Britannia, substantially a and for the purpose set forth.

35,458.—Morris Mattson, of Boston, Mass., for Improvement in Douche Baths :

I claim a bath apparatus, consisting essentially of two or more tank or reservoirs containing water of different temperatures, the outle from which unite in one delivery pipe, and are commanded by a suitable cock or cocks, substantially in the manner specified, for the purpose specified.

35,459.—John Maxheimer, of New York City, for Improvement in Bird Cages :

I claim the arrangement and combination of the cups, C, with the cage, A, and sliding doors, B, as shown and described ; so that the door will rest upon the cups, holding them in place and preventing the waste of seed ; also permitting the filling of the cups without their removal ; likewise entirely closing the opening when the cup are removed for cleaning, all as set forth.

[This invention consists in attaching the seed and water cups to the cage in a novel way, and using in connection therewith sliding doors arranged in such a manner relatively with the cups, that when the latter are detached or removed from the cage for the purpose of being cleaned, the doors will fall by their own gravity, and close the openings in which the cups are fitted so as to prevent the escape of the bird, the doors also when the cups are adjusted to the cage serving as guards to prevent the seed being thrown from the cups by the bird and at the same time admitting of the cups being replenished with seed and water without removing them from the cage.]

35,460.—R. S. Merrill, of Lynn, Mass., for Improvement in Coal-Oil and other Lamps :

I claim the combination of an oil reservoir and burner, under the arrangement set forth, so that the burning part of the wick shall be constantly supplied with oil, automatically, substantially as described.

35,461.—Jacob Miller, of Canton, Ohio, for Improvement in Fanning Mills :

I claim, first, In combination with the main shoe and its riddle, the transverse trough and its riddle, for the purpose of giving the grain a second cleaning as it passes to the side of the machine, substantially as described.

I also claim in combination with the transverse trough and its riddle, a conducting pipe for introducing a blast into the trough, to give the grain a second action of air as it passes over the transverse riddle, substantially as described.

I also claim the so arranging of the riddle or riddles in the trough, as that they may be inclined to either side of the machine, for the purpose and substantially in the manner set forth.

35,462.—Jacob Miller, of Canton, Ohio, for Improvement in Fanning Mills :

I claim, first, In combination with the main riddle and shoe, an auxiliary riddle on the side of the fanning mill to give the grain a second cleaning, substantially as described

I also claim in combination with the auxiliary riddle, a conducting pipe or air passage for introducing a blast to said riddle, substantially as described.

I also claim in combination with the main riddle and shoe, and the auxiliary riddle, a conveying apparatus for bringing the grain from underneath the main riddle to the auxiliary riddle, substantially as described.

I also claim the so constructing of the fanning mill and the auxiliary riddle, as that the latter may be used on either side of the machine preferred, substantially as described.

35,463.—Jacob Miller, of Canton, Ohio, for Improvement in Fanning Mills :

I claim the arrangement of the riddle, C E, and conducting board, D, with the two wind passages, and the delivery spout or trough, I, for the purpose of subjecting the grain to a double or second current of air to clean it, substantially as described.

35,464.—Jonathan Mosteller, of Lock Haven, Penn., for Improved Cement for Roofing and for other Purposes :

I claim the combination of the ingredients mentioned, with the mode and manner of applying and coloring the same, substantially as described and for the purpose set forth.

35,465.—Alvan Munson, of Peterborough, N. H., for Improvement in Pumps :

I claim, first, Having the piston, H, provided with a V-shaped edge, a*, at the outer part of its valve seat when used in connection with the groove or channel, b, in the chamber, A, and the projection, a, of the cheek, valve, D, arranged as shown to admit of the escape of water from the pump by the depressing or forcing down of the piston, as and for the purpose set forth.

Second, Connecting or securing the handle, K, to the shaft, G, by means of the eye, e, collar, L, provided with the teeth, h, the notches, i, in shaft, G, and the nut, M, all arranged as shown, whereby the position of the handle, K, may be changed or varied on the shaft, as circumstances may require.

[This invention consists in constructing the body or chamber of the pump of sector form in its transverse section, and having the same provided with an oscillating valvular plunger and piston, and a check or retaining valve, whereby a combined lift and force pump of very simple construction is obtained, and one that may be readily repaired when necessary, its valves being rendered very accessible, and one also which will admit of the water escaping at the termination of its work in order to prevent difficulty from freezing.]

35,466.—G. W. Nichols, of Wheatland, Iowa, for Improvement in Rotary Pumps :

I claim the combination of the eccentric inner driving cylinder, B, transmitting the water through itself, with the outer cylinder, A, and piston, C, substantially as specified.

I also claim the sliding piston, C, transmitting the water to the cylinder, B, in combination with said cylinder, B, and outer cylinder, A, substantially as specified.

I also claim the combination of the transmitting cavities, e e, in the piston, C, with the valve aperture, p p, in the cylinder, B, arranged and operating substantially as specified.

I also claim the combination of the side chambers, t t, and perforated partitions, b b, in the cylinder, B, with the piston, C, substantially as set forth.

I also claim the employment of the revolving driving shaft, D, as the elevating pipe, in combination with the cylinders, A and B, substantially as specified.

I also claim the combination of the tubes, l and m, arranged and operating substantially as and for the purpose specified.

35,467.—F. E. Oliver, of New York City, for Combination of Pencil Sleeve and Eraser :

I claim as an article of manufacture the combined sleeve and eraser, constructed to operated substantially in the manner and for the purposes specified.

35,468.—Frederick Pohlman, of Coxsackie, N. Y., for Improvement in Hay and Straw Cutters :

I claim, first, The combination of the knife with the lever, C, the treadle, G, and the shaft, H, the whole acting as and for the purposes named.

Second, The feeder, J, as connected with the shaft, H, and the springs, M and N, and as supported by guide, K, and working in the transverse slot, as described, the whole constructed in the manner and working essentially as and for the purposes set forth.

35,469.—D. C. Rand and M. Wadhams, of Perinton, N. Y., for Improvement in Drying Grain and similar Substances :

We claim the employment of a rotating cylinder for containing and keeping in motion the material acted upon, provided with a valve or valves, or their equivalent, acting automatically for the admission of air for ventilating the contents, substantially in the manner and for the purposes shown and described.

35,470.—C. W. Rawson, of Little Prairie Ronde, Mich., for Improvement in Stump Extractors :

I claim the combination of the gearing, C E E, with the shaft, B, and drums, D D′, the latter having the ropes, F F, wound on them in the same direction, and all arranged on a framing, A, for joint operation, as and for the purpose set forth.

35,471.—H. B. Record, of Turner, Maine, for Improvement in Tree Protectors :

I claim the shield and bonnet, made, constructed and used in manner and form substantially as described.

35,472.—Nathan Richardson, of Gloucester, Mass., for Improved Fish Cutter or Bait Mill :

I claim the combination of the series of triangular teeth, J, acting as cutters, with the opposite series of triangular teeth, J, acting both as cutters and feeders, with the washers, K, substantially as described for the purpose specified.

35,473.—G. J. and H. W. Ross, of New York City, for Improvement in Hydrants :

I claim the arrangement of the spring with the rotary eduction pipe in the manner shown and described.

[This invention consists in having the eduction pipe of the hydrant connected with a cock in the main or supply pipe, and so arranged as to turn and operate the cock, that is to say, open and close it; the eduction pipe being connected with a spring, so applied as to automatically close the valve, and cut off the supply of water when the operator releases the eduction pipe after turning it for a supply of water.]

35,474.—T. W. Roys, of Southampton, N. Y., for Improved Rocket Harpoon :

I claim the combination of a harpoon and rocket with a bomb, substantially as described, for the purpose of killing whales.

I also claim the bar, g g, connecting the barb of the harpoon with the shank of the rocket and its barbs or wings, e e.

35,475.—T. W. Roys, of Southampton, N. Y., for Improvement in Propellers :

I claim making the tracks or ways, on the bottom and in the inside of the vessel, as described, and arranging the propeller therein, and operating the same, substantially in the manner as set forth.

35,476.—T. W. Roys, of Southampton, N. Y., for Improved Apparatus for Raising Sunken Whales to the Surface of the Water :

I claim, first, The construction of an instrument for raising whales, with side eyes or clasps, by which it may be guided by the harpoon line to the body of a whale as described.

Second, The formation of an eye on a whale raiser through which a hawser may be hauled by means of a cod line, in the manner specified.

Third, The use of a barbed instrument combined with a small line on reels, substantially as described, for the purpose of attaching a hawser to a whale.

35,477.—F. M. Ruschhaupt and John Schulte, of New York City, for Improved Percussion Powder :

We claim the application of tanin, pyrogallic acid, or substances analogous in physical and chemical properties to them, in a manner as described and for the purpose set forth.

35,478.—Samuel Slocomb, of East Cambridge, Mass., for Improvement in Inkstands :

I claim the improved piston and well inkstand as made with the ground or air-tight joint arranged on the top of the neck of the ink reservoir, and on the bottom of the flanch of the ink cup and with the annular space between the neck and the cup as set forth.

35,479.—J. W. Stout, of Raritan, N. J., for Improvement in Harvesters :

I claim the combination and arrangement of the frame, F, on the axles, D D, of the wheels, B B, with the gearing, E E H H, ratchets, I I, pawls, J J, and bevel gears, K L, substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of reaping and mowing machines, which have their sickles and driving gear attached to a frame which is allowed to swing on the axle of the wheels, on which the main frame is mounted.]

35,480.—Harvey Mann, of Bellfonte, Pa., for Improvement in Axes :

I claim scarfing the steel at its edges, and bending it into a U or bow-shape so as to slip over the end of the blank or iron part of the ax, to be welded thereon, substantially in the manner and for the purpose represented.

35,481.—L. J. Whitcomb and W. E. Prall, of Maineville, Ohio, for Improvement in Apparatus for Evaporating Saccharine Juices :

We claim, first, The arrangement of a range of boiling pans upon a common level, communicating through apertures, adapted to be simultaneously opened or closed by the connected series of deflecting valves, E, constructed and operating substantially as and for the purposes set forth.

Second, The arrangement of side defecators or settling pans, H H′, adapted to be elevated and depressed and operated in the manner set forth.

Third, The decanting faucet, J j j′, having a provision for gradual descent of the discharging aperture or ventage, as and for the objects stated.

Fourth, The arrangement of the reservoir, M, which receives crude sap from the mill, and discharges the same into the first boiling pan by a pipe, N, which traverses the furnaces for pre-heating the crude sap, as set forth.

35,482.—Jonathan White, of Antrim, N. H., for Improved Apple Parer :

I claim my improved apple-paring machine made substantially as described, viz., not only with its paring tool, h, or the stock, G, thereof, applied to a vibratory arm, F, controlled by a spring, or its equivalent, and with its apple mandrel, A, supported by a vibratory frame, B, but with a stationary notched sector, d, and a train of gears, a b c, and with a cam, i, and stop, k, the whole being so as to operate substantially in the manner and for the purpose as specified.

35,483.—C. J. Woolson, of Cleveland, Ohio, for Improvement in Cooking Stoves :

I claim the construction and arrangement of the perpendicular and horizontal connecting bars, in the fire chamber of cooking stoves, in the manner described and for the purposes set forth.

35,484.—Horatio Worcester, of New York City, for Improvement in Iron Frames of Pianos :

I claim the plate, made in two pieces, D and F, connected by a hinge or coupling, E, the effect of both being to give a more full and complete vibration to the sounding board.

35,485.—David Zug, of Shaefferstown, Pa., for Improvement in Harvesters :

I claim, first, The tubulated and flanged pawl heads, 61, connected with the main shaft or axle, W, of the machine, in combination with the ratchet box, b, which forms the hub of the traction wheels, B, and is supported on the tubes, c, of the pawl heads; for the purpose and in the manner specified.

Second, I claim the double flanged and slotted hanger, 5, constructed and applied in the manner and for the purpose specified.

Third, I claim the specific construction and arrangement of the hinge plate, Q, for adjusting the pulley, N, on the dividing shoe, L, in combination with the loose and changeable perforated lug, o, for the purpose set forth.

Fourth, I claim the arrangement and construction of the T-flanged, sliding screw boxes, H1 H2, in combination with the screw, F, for regulating the reel shaft in the manner specified.

35,486.—S. E. Cleveland (assignor to Jonathan Mayhew & T. S. Ray), of Buffalo, N. Y., for Improvement in Head Lights for Locomotives :

I claim, first, The combination and arrangement of the perforated tube, E, oil and wick chamber, A, and perforated shield, G, the said perforated tube being connected to the bottom of the oil chamber, for the purpose of modifying the supply of air to the interior of the wick and flame, and the perforated shield being connected to the top, for the purpose of modifying the supply of air to the exterior of the wick and flame substantially as described.

Second, A double or compound stuffing box having two glands, the smaller within the larger, constructed and operating substantially as set forth.

Third, The extension of the oil chamber downwardly, as represented by the flat tube, I, in combination with the rack end pinion and narrow ring, for raising and lowering the circular wick, substantially as set forth.

Fourth, The sliding bottom, F, in combination with the perforated tube, E, for opening and closing the mouth of the tube, substantially as set forth.

35,487.—J. C. Conklin, of Yorktown, N. Y., assignor to G. W. Depew, of Peekskill, N. Y., for Improvement in Harrows :

I claim the application of the teeth bars of a harrow to an axle in such a manner that each tooth or pair of teeth may move independently of the rest, substantially as set forth.

35,488.—James C. Cooke (assignor to himself and Julius Hotchkiss), of Middletown, Conn., for Improvement in Breech-loading Firearms :

I claim, first, The operation of the breech piece so that it moves upward and forward, and enters into the breech end of the firearm a distance from its connections in a line or nearly so with the bore of the barrel, and moves out of the bore of the firearm, downward and backward, when the lever guard is moved in a converse direction, substantially as and for the purposes set forth.

Second, Constructing the socketed breech piece, B, with a screw thread, e, and with an aperture, h, so as to receive a sleeve, f, and admit a pin wrench to holes in the sleeve, and also that the sleeve may be made to follow the plug, b, and support it when an outward adjustment is made, all in the manner and for the purpose described.

Third, The beveled shoulder piece, d, in combination with the beveled breech piece, B, substantially as and for the purposes set forth.

Fourth, The combination of the link, G, breech piece, B, links, D E, and lever guard for performing the functions named in the first claim above, substantially as set forth.

Fifth, The combination of the link, G, and shoulder piece, d, substantially as and for the purposes set forth.

35,489.—H. S. Phillips (assignor to himself and G. E. Noble), of Westfield, Mass., for Improvement in Sash Fasteners :

I claim the combination of the rack, 4, and cogwheel, 6, with the rack, 5, and fastener, 7, constructed and arranged in the manner and for the purposes set forth.

35,490.—J. B. Schalkenbach, of Triers, Prussia, assignor to E. Justh, of San Francisco, Cal., for Piano Orchestra :

I claim, first, The application, in combination with harmoniums, pianofortes, or other instruments played by keys, of percussion instruments, such as drums, cymbals, tam-tam and triangle, arranged substantially as described, whereby the player is enabled to play the said percussion instruments by making use of his hand or arm while playing with the fingers on the keys of the other instrument, substantially as set forth.

Second, The use for playing the drum or cymbal of elastic sticks, g g n o p, arranged and having springs, j k, applied to their butts and operated by means of keys, g2 g3 n2 o2 p2, connected with the butts, all substantially as set forth.

Third, The employment of mechanism, substantially such as is represented in figures 3 and 4, and described, applied to operate upon the keys to retain the valves of the harmonium or other wind instrument, in an open condition when desired, substantially as set forth.

Fourth, The metallic tubes or funnels, U U, applied in combination with the harmonium or other reed instrument, substantially as specified.

Fifth, The relative arrangement of the several percussion instruments, consisting of the drum, cymbal tam-tam and triangle and their playing mechanism, substantially as set forth.

35,491.—B. S. Stokes (assignor to himself and W. H. Burwick), of Manchester, N. H., for Improvement in Mouth Pieces for Cigars and Pipes :

I claim the construction substantially as described, of ventilating mouth pieces for cigars and pipes, so that one or more currents of cold air may be inhaled into the mouth, at the same time the smoke is received through duels independent of the smoke duct, for the purposes set forth.

35,492.—H. D. Stover and E. S. Wright, of New York City, assignor to said H. D. Stover, for Improvement in Scroll Sawing Machines :

We claim, first, The method of hanging the saws by means of straps to the forward and segmental ends of two walking beams or levers, the rear end of which is restrained by a spring, arranged and operating substantially in the manner set forth.

Second, The method of permanently maintaining the requisite tension throughout the whole stroke of the saw, by means of a spring applied to each end of the saw, the two springs being constructed, arranged and operating as described, to compensate each other, substantially in the manner set forth.

Second, The method of regulating the amount of tension to the saw by combining with each of the tension-producing springs a screw or its equivalent, so operating upon the said spring as to increase or decrease its elasticity, both the springs and screw being arranged in relation to each other and in relation to the moving parts of the machinery, so that the regulating of the tension may be effected while the the saw is in motion, substantially in the manner described.

Fourth, In combination with the slide piece or buckle, we claim a guide block, constructed and arranged as described to admit of adjustment within an adjustable guide bed, in accordance with the length and rake of the saw.

Fifth, The employment of vulcanized india-rubber springs, the constituent parts whereof are constructed, arranged and combined as described, so that the springs shall operate by virtue of compressibility in contradistinction of the tensibility of india rubber.

35,493.—Dwight Tracy, of Worcester, Mass., assignor to himself and J. P. Hale, of New York City, for Improvement in Spools for Sewing Thread :

First, I claim uniting the parts of spools and forming the tube or barrel thereof, by the stock of the heads turned inward, substantially as described and specified.

Second, I claim securing the heads upon the tube or barrel by pinching them between the flanges raised in the tube or barrel, substantially as set forth and specified.

35,494.—W. A. Barlow, of Elkhorn, Wis., for Improvement in Stoves :

I claim the combination of the four tubes, E E E E, cap, C, body, B, opening and cover, K, door, N, damper, G, opening, H, valve, I, or its place, hood and self-regulator, M, with hollow base, A, with partitions, a a, flue, F, connecting rods, D, in the manner shown and described, all being arranged as and for the purpose set forth.

[The object of this invention is to obtain a stove by which the heat will be radiated more perfectly than hitherto, and in which stove the draft may be changed with great facility, from a direct to a circuitous one, and *vice versa*.]

25,495.—Richard Montgomery, of New York City, for Improved Shield for Iron-clad Vessels :

I claim a shield, arranged and operating substantially in the manner set forth.

35,496.—Richard Montgomery, of New York City, for Improvement in Apparatus for Bending Corrugated Plates of Metal :

I claim the construction and arrangement of formers so shaped and fitted to each other as to prevent the spreading or crinkling of corrugated beams or plates, while in the process of being bent into curves, in the manner described, and for the purposes set forth.

RE-ISSUES.

1,312.—Jacob Swartz, of Buffalo, N. Y., for Improvement in Harvesters. Patented Nov. 14, 1854. Re-issued June 5, 1860 :

I claim, in combination with the main frame of a harvester and a short laterally-projecting finger bar carrying cutters reciprocating in a straight line, a shoe whose front end is sloped forward and upward above the points of the fingers, substantially as shown, through which said finger bar receives all its connection with the main frame of the machine, when said shoe is secured to the main frame through the medium of a hinge connection.

1,314.—Jacob Swartz, of Buffalo, N. Y., for Improvement in Harvesters. Patented Nov. 14, 1854. Re-issued June, 5, 1860 :

I claim, first, In combination with the main frame of a harvester, and the finger bar, G, and shoe, F, or their equivalents, the coupling arm, E, or an equivalent thereof, which, when drawn forward by said main frame, will draw forward said finger bar and vary the longitudinal distance of its heel from the frame, when raised and lowered in respect thereto, substantially as described.

Second, Making that end of the coupling arm, E, or its equivalent, which is connected with hangers, C and D, with a front and rear branch, for the purpose specified.

Third, Making the vibrating end of the coupling arm, E, or its equivalent, with a front and rear branch, for the purposes specified.

Fourth, Making the central portion of the coupling arm, E, or its equivalent, of less width than the front of the front branch to the rear of the rear branch of its inner end where the hinge pins pass through.

Fifth, Making the central portion of the coupling arm, E, or its equivalent, of less width than from the front of the front branch to the rear of the rear branch of its vibrating end, where the hinge pins pass through.

Sixth, Making the branch, b, of the coupling arm, E, or its equivalent, to extend further back than its branch, d.

Seventh, Making the branch, c, of the coupling arm, E, or its equivalent, to extend further forward than branch a.

Eighth, Hinging branches, a and b, of the coupling arm, E, or its equivalent, each to a different member of the machine.

Ninth, Causing branch, c, of the coupling arm, E, or its equivalent, to occupy one cavity in the shoe, F, or its equivalent, and branch d, to occupy a different cavity therein.

Tenth, Placing the branch, d, of the coupling arm, E, or its equivalent, over the heel of the finger bar and branch, c, in front of and of a corresponding hight with branch, d.

1,315.—Jacob Swartz, of Buffalo, N. Y., for Improvement in Harvesters. Patented Nov. 14, 1854. Re-issued June 5, 1860 :

I claim, first, The combination with the main frame of a harvester of the coupling arm, E, finger bar, G, and cutter bar, n, substantially in the manner described.

Second, The combination with the main frame of a harvester of the coupling arm, E, finger bar, G, cutter bar, n, and pitman, p, or their equivalents, substantially in the manner described, whereby the relative position of the cutters and fingers to each other are not materially varied, when raised or lowered in respect to said main frame.

Third, Limiting the distance which the inner end of the above-described cutting apparatus will vibrate from and toward the main frame to which it is connected by the upright post, Q, arm, E, hinge pins, a′ and b′, vertical slot, c′, and set screw, d′, or their equivalents, substantially as described.

Fourth, So connecting said cutting apparatus to the main frame of the machine, by the post, Q, arm, E, hinge pins, a′ and b′, vertical slot, c′, and set screws, d′, or their equivalents, that it can be retained at various hights above the ground, substantially as described.

1,316.—J. H. Snyder, of Troy, N. Y., for Improvement in Manufacturing Railroad Chairs. Patented July 13, 1858 :

I claim making the continuous jaw or lip of railroad chairs by rolling and forming the same by means of suitably-shaped rollers mount-

od and running in conjunction with each other, substantially as described and set forth.

I also claim the forming of continuous jaws or lips of railroad chairs by rolling into the solid iron of the flange, on the blank bar of which the said lips are composed, and which flange for said jaw or lips is raised upon the blank bar, as aforesaid, by means of said rollers, described and set forth, or by means of any rollers substantially the same.

DESIGNS.

1,600.—A. C. Barstow, of Providence, R. I., for Design for a Parlor Stove.

1,601.—T. G. Bering, of Philadelphia, Pa., for Design for a Fence.

1,602.—J. G. Folsom and B. D. Whitney, of Winchendon, Mass., assignors to J. G. Folsom aforesaid, for Design for a Sewing Machine Frame.

1,603.—P. H. Jackson, of New York City, for Design for a Fire-place Frame.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-Issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

H. K., of Wis.—Your application for a patent is now pending before the Patent Office. We cannot, therefore, introduce into the paper any such additional matter as you describe. If the additional improvement is important, you had better make a new case of it; in fact, you can proceed in no other way.

J. G. S., of Conn.—Whether a third party could patent, or use a combination composed of elements existing in two prior patents, depends altogether on the nature of the patented claims.

S. M., of Del.—The changing of one fluid for another in a chamber, for keeping cool the tube of a kerosene lamp wick, would not be patented. For a description of Adamas see page 340 of this volume.

W. A. C., of Mass.—We can supply the back numbers of the SCIENTIFIC AMERICAN to January last. We shall be happy to enrol your friend's name amongst our list of subscribers. It is not new to provide a cannon with a central twisted or rifled rod, and construct projectiles for the same with twisted or rifled central openings to fit the same rod, for the purpose of obtaining rotary motion.

W. S., of Ill.—You do not require any ingredient in boiling water to soften the timber that may be boiled therein, such as plow handles, for the purpose of bending them. Steaming timber will answer just as well as boiling it.

R. H., of Pa.—Cement to stop the seams of a boiler from leaking, should always be applied inside. In a locomotive carrying the usual high pressure steam, the best cement is of little avail.

O. O., of N. Y.—Water may be admitted into the Stevens floating battery by pumping or by a valve in the bottom. It is discharged by a pump. Water ballasting is employed in some of the coal carrying vessels in England.

J. W., of N. J.—Gem salt must be a local term. If it is used for petrifying substances, as you have stated, it is probably the fluate of lime.

J. L. H., of Minn.—There is not any metallic alloy that will expand and contract, as packing in a cylinder, in the same ratio as the cast iron of the cylinder. One square foot of grate surface, and nine square feet of effective heating surface, are allowed for the horse power of a boiler. Only one half the flue or the tube surface is considered effective heating surface.

J. H. G., of Iowa.—So far as we have been able to ascertain, American sweet potatoes have not yet become an article of export to Europe. If packed in dry saw dust and kept dry, we think they would keep on a voyage across the Atlantic.

H. R., of N. Y.—There is no published work extant which contains illustrations and descriptions of the improved apparatus lately introduced for heating buildings with dry fire heat, hot water and steam. You can only obtain a practical knowledge of these by examining them in buildings where they have been put up. We thought you wished to get a work like Griscom's or Reid's, chiefly devoted to ventilation.

T. E. M., of Phil.—Plaster of Paris figures may be bronzed by giving them a few coats of size, allowing each to dry, then applying the bronze as a varnish. Bronze powders of all colors can be purchased at almost every store where artists' materials are sold. You may mix these powders with glue, or with lac varnish, and apply them to the figures with a brush. The bronze may also be dusted on when the size is damp. Melted pitch is about the best cement known to us for an aquarium. Cocoa nut oil is obtained by grinding the kernel of the nuts and submitting this to pressure in bags. It is said to be inferior to olive oil for the hair.

J. H. B., of Minn.—We cannot recommend you to a better source for obtaining information respecting governors of steam engines than the published volumes of the SCIENTIFIC AMERICAN. These contain illustrations of most of the improved governors. The gyroscopic governor is illustrated on page 193, Vol. III. (new series.) We do not know where A. Judson, the inventor of the Judson Valve resides at present.

W. P., of Md.—The law is silent as to the time when the $20 additional fee should be paid on the issue of Letters Patent. If you have no good reasons for delay, we advise you to forward the fee at once and have your patent issue, as you are less likely to encounter an interfering application.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000; Belgium, 5,000,000, Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, June 11, 1862:—

J. E. T., of N. Y., $15; J. B. W., of N. J., $10; H. B. S., of Ill., $15; A. D., of Pa., $15; J. H. & G. W. S., of N. Y., $25; M. W., of Ky., $15; W. H. G., of N. Y., $80; C. & C., of Pa., $10; F. & A., of N. Y., $22; C. F. B., of R. I., $40; J. D., of Mich., $35; E. W., of Mass., $25; S. S. B., of O, $15; T. M. C., of Me., $25; J. E. K., of N. Y., $20; J. K. B., of Ind., $25; S. M., of Del., $25; K. & H., of Wis., $30; C. M., of N. B., $20; A. S. B., of Conn., $25; T. & M., of Conn., $25; R. K., of Mass., $15; J. C. & Co., of Mich., $15; G. W. H., of Ill., $10; D. H., of Ill., $15; B. S., of N. J., $15; H. H., of N. Y., $10; L. & P. K. D., of N. Y., $15; B. R., of Mass., $40; K. & M., of Ill., $25; D. & R., of Iowa, $25; J. A. R., of N. Y., $15; J. S. R., of N. Y., $15; J. T., of N. Y., $30; E. G. H., of Mass., $40; C. C. M., of N. Y., $15; J. C. R., of N. Y., $15; W. H. C., of N. Y., $15; S. S. H., of Wis., $30; S. B. E., of Conn., $25; R. F., of Mass., $25; W. S. H., of O., $25; J. G. Y., Jr., of Me., $25; C. S. I., of Ind., $25; H. B. B., of Mass., $25; W. H. W., of N. Y., $25; H. T. P., of Mass., $25; J. H. H., of N. H., $25; G. P. P., of Conn., $10; G. B. H., of N. Y., $25; L. L., of N. Y., $25; C. W., of N. Y., $20; J. H. K., of Pa., $20; J. C. M., of Ill., $20; R. D. D., of Iowa, 20; P. & P., of Ill., $20; E. M. C., of N. Y., $20; J. B., of N. Y., $30; D. C., of N. Y., $10; F. W., of N. J., $20; H. W. O., of Conn., $30; A. & M., of Wis., $50; B. & E. H., of Ill., $20; W. H. W., of N. Y., $20; W. B., of N. Y., $20; J. S. B., of Ind., $20; A. B. C., of Iowa, $20; H. K., of Wis., $20; S. & A., of Mass., $45; M. H., of Iowa, $20; J. D. S., of Ill., $20; W. F., of Germany, $20; C. & G. M. W., of N. Y., $40; R. A. T., of N. Y., $20; N. McG., of N. Y., $15; M. R. S., of N. Y., $30.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from June 4th to Wednesday, June 11, 1862:—

R. A. T., of N. Y.; C. & G. M. W., of N. Y.; A. I. A., of Wis.; L. L., of N. Y.; G. B. H., of N. Y.; J. G. W., of N. Y.; M. R. S., of N. Y.; J. K. B., of Ill.; J. D., of Mich.; E. W., of Mass.; C. & C. of O.; T. M. C., of Me.; S. S. B., of O.; J. H. & G. W. S., of N. Y.; S. M., of Del.; A. S. B., of Conn.; T. & M., of Conn.; W. S. H., of O.; H. T. P., of Miss.; W. H. W., of N. Y.; J. G. Y., Jr., of Me.; J. H. H., of N. H.; R. F., Jr., of Mass.; M. & K., of Ill.; W. & T., of N. Y.; J. T., of N. Y., (2 cases,) C. A. M., of Pa.; S. B. E., of Conn.; W. H. G., of N. Y.; (2 cases,) H. I. S., of N. Y.; J. K., of N. Y.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,

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VOLUMES I., II., III., IV., V. (NEW SERIES) COMplete (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1 50 per volume, by mail, $2—which include postage. Price, in sheets, $1. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding.

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INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

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TO MANUFACTURERS OF THERMOMETERS.—THE undersigned having made an improvement on a thermometer for regulating the heat of metals used in tempering, would like to dispose of the invention. It is spoken of by the editor of this paper, as being new and useful. Address E. H. Hill, Worcester, Mass. 24 2*

ASSAYING ORES AND METALS.—THE UNDERsigned offers his services in assaying all descriptions of ores, metals and chemical products. L. C. Bierwirth, 69 Pine street, New York. 24 4*

NOTICE TO INVENTORS.—THE AMOUNT REQUIRED for obtaining patents on a limited number of good inventions will be paid by the subscriber for an equal interest therein. Parties applying, expected to devote themselves immediately and actively, and successfully to their patents, in the sale of rights, with special compensation. Good references given and required. For further particulars address soon, C. P. STIMETS, Box 740, Washington, D. C. 24 2*

PICKERS.—RICHARD KITSON, HEAD OF WORTHEN street, Lowell, Mass.—Manufacturer of Kitson's Patent Cotton Mixer, Kitson's Patent Cotton Opener, Kitson's Patent Cotton Picker, Kitson's Patent Cotton Waste Machine and Rag Picker; also Budd's English Scutchers (pickers), of the following celebrated patterns:—Walker & Hacking, Lorg & Brothers, Taylor, Lang & Co., Manufactures Needle-Pointed Card Clothing, for Carding Hemp, Jute, Flax, &c. Parties in want of second-hand pickers can be informed where to procure them. 21 13

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b S. C. HILLS, No. 12 Platt-street, New York.

TERRYVILLE CLOCK SPRING COMPANY.—MANUfacturers of Polished Clock, Watch and Toy Springs, Terryville, Conn. 19 25*

TO PETROLEUM REFINERS.—FOR THE SUM OF $20, inclosed in any communication, I will furnish a printed formula for mixing a fire and oil-proof cement, perfectly indestructible and warranted to be reliable in any situation where tight and lasting joints are desirable. The cement has been in constant use for five years at the Downer Kerosene Oil Co.'s works, in Boston, and in no case has it failed to make a perfect joint in the most severe situations, or when exposed to great heat. Among its other advantages it is much less costly than most articles used for making joints. It can be obtained at any respectable druggists. Address, postage inclosed, JOSHUA MORRILL, Supt. Downer Kerosene Oil Co., No. 76 Water street, Boston, Mass. 23 4*

NOTICE TO INVENTORS AND MANUFACTURERS. —We are the exclusive owners, under Goodyear's patent, of the rights to manufacture, use and sell Vulcanized India Rubber, "so far as it may or can be used," for rolls and coverings for rolls for washing, wringing and starching machines. We know that the "clothes squeezer" must be a necessity in every family so soon as known, and we desire to encourage other parties in the manufacture of it. We, therefore, license makers of good wringers upon liberal terms, and furnish them promptly with the best of rubber rolls—a large supply of which we keep constantly on hand. All parties infringing our rights will be prosecuted to the extent of the law. Address, METROPOLITAN WASHING MACHINE CO., Middlefield, Conn.
20 tf. DAVID LYMAN, Treas.

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Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.—*Gentlemen:* It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your Agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, WM. D. BISHOP.

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A MESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise et qui préfèreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natalie. Envoyez nous un dessein et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,
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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

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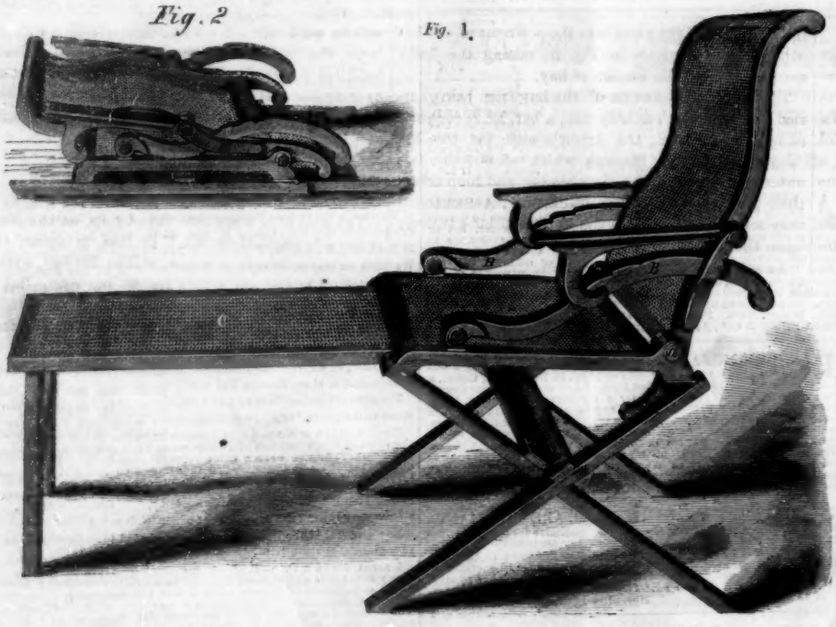
The accompanying engravings represent a folding chair designed especially for camp use, though it will be found remarkably comfortable and convenient in any house.

It is constructed with hinge joints so that it may be arranged as shown in Fig. 1, or folded in the compact form represented in Fig. 2. The frame is made of hard tough wood, and the back and seat are covered with cane or may be upholstered. The back is joined to the seat by a hinge at *a*, so that it may be folded flat down upon the seat, or inclined at any angle desired. In order to hold it at such an angle as to make a comfortable seat, the arms are attached to the back by hinged joints, and their forward ends

Fig. 2

Fig. 1.



HARDY'S FOLDING ARMY CHAIR.

are forked to receive the curved links, B B, which have notches upon them to catch and hold the arms. By making several of these notches the inclination of the back may be varied at will, and yet held firmly in the position to which it is adjusted. The legs are joined together in two pairs and one pair is hinged to the front edge of the seat and the other to the back edge. The pair which is attached to the front edge is made sufficiently narrow to swing between the other pair, and when in the position shown in Fig. 1, the cross bar of the inner pair rests upon the cross bar of the outer pair, and retains the legs in position.

To support the legs and feet of the occupant, the frame, C, is attached by hinges to the front edge of the seat; the forward end of this frame being supported by legs.

The several joints and hinges described enable the chair to be folded into the small compass represented in Fig. 2.

The American patent for this invention was granted August 20, 1861. It has also been patented in France and Belgium. Further information in relation to it may be obtained by addressing the inventor, Peter J. Hardy, at 150 and 152 Prince street, New York, or at 367 Washington street, Boston.

The Great American Desert—A Novel Enterprise.

In the acquisition of Territory from Mexico we acquired not only good, bad and indifferent lands, but we got a desert, and so large in its dimensions, so formidable in its withering desolations, that we are as much at a loss to know what to do with it as was the party who drew the elephant. Professor Blake, who, from his position of geologist, accompanying the exploring and surveying expedition of Capt. Williamson, of the Atlantic and Pacific Railroad Survey, acquired a personal and familiar knowledge of this *journado del muerta"* (desert of death), in a recent lecture in San Francisco, in speaking of the Colorado Desert, pronounced it as fine a specimen of the desert as that of Lybia or Sahara. It extends from the base of San Bernardino southwesterly one hundred and eighty miles, parts of its surface being below our boundary line in Sonora. Its area is some nine thousand square miles; and excepting the Colorado, which cuts across its lower end, is without river or lake. It stretches off to the horizon on all sides without one glimpse of vegetation or life. Its surface is ashy and parched; its frame of mountains rise in rugged pinnacles of brown rock, bare even of soil. Words are unequal to the task of describing its apparent expanses, the purity of its air, the silence of its night, the brilliancy of the stars that overhang it, the tints of the mountains at daybreak, the looming up of those beyond the horizon, the glare of the midday sun, the violence of its local storms of dust and sand.

Parts are entirely destitute even of sand, being smooth, compact, sun-baked clay; other parts are covered with heaps of sand, disposed like snow-drifts in waves of fifty and eighty feet in hight. Near the mountains along the Colorado there is a terrace as flat as the floor, and paved with pebbles of nearly uniform size, of porphyry, jasper, quartz, cornelian, and agate, all rounded by the action of the water, and polished till they glisten, by the driving sand. In this respect, again, the porch of our Great Desert is like that which outlines the Lybian Desert. Doubtless the northern part of the desert is the dry bed of an ancient lake of fresh water, whose beach lines are strongly marked. Probably, at a comparitively recent period, the water of the California Gulf covered all the clay surface of the desert. It lies below their level now, and if a channel were cut through the natural embankment of the Colorado, it would be doubtless covered again with water. It is very probable that the Colorado Desert region was uplifted within historic times. Earthquakes occasionally agitate its surface, and in 1852 there were eruptions of mud and hot water in the central parts of the valley.

The *National Intelligencer* says that an enterprise is on foot for converting this formidable desert into a fruitful field by introducing water from the Colorado river on and over it, thus causing verdure to replace sterility, "causing the desert to bloom as the rose."

The propagator of this enterprise having devoted several years in the preliminary work, and having fully determined the practicability of the measure by actual instrumental surveys, now awaits the action of Congress to make a cession of this Sahara to the State of California, in compliance with the expressed wish of her Legislature. It cannot be doubted that Congress will at once comply with the application made by California, and allow the parties to go on with this novel work, which promises to be of so much benefit to the government and mankind.

GREAT PUMPING ENGINES.—The quantity of water pumped up daily for the city of London is 150,000,000 of gallons. Of this enormous quantity 79,000,000 of gallons are pumped by single acting steam engines. One of these engines when working at full power throws 9,000 gallons per minute to a hight of 140 feet. The water thus raised is conveyed into London by cast iron pipes 36-inches in diameter. The cylinder of this engine is 112-inches in diameter, and weighs 36 tuns.

STEAM ON CANALS.—The Schenectady Locomotive works are constructing some engines for canal boats, which are much on the locomotive principle. Machinists on the line of the canal believe that the exertions which have been made to substitute steam for horses on canals, will result in permanent success. A considerable number of steamers, supposed to be nearly a hundred, have been at work, many of them with decided advantage.

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